Exploring the effect of digital reflective practice on the creativity of Pakistani textile design undergraduate students: a multiple case study

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by Umer Hameed

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Abstract

Reflective practice (RP) is widespread in education and other academic and professional disciplines. Increasing attention has been paid to reflective practice in the professional literature. Much of this has responded to Schon's (1983, 1985, 1987) writing about learning and reflection. Changing scenarios in higher education worked as a catalyst in transforming reflection from paper journal writing to digital technologies. Digital video recordings have added a new dimension to the possibilities of encouraging and sustaining both individual and collective reflection. Digital video recordings have been integrated both into education and professional development. The textile industry is one of the significant sectors in Pakistan, and about 45 higher education institutions offer undergraduate programs in textile, clothing, and related disciplines. The study aimed to understand how textile design students engaged in digital reflective practice and how this informed and influenced their creativity in the design process.

Theoretically informed by the constructivist-interpretivist lens., the present research is based on a multiple-case approach that aims to incorporate the views of textile design teachers, heads of departments, and students. Through interview data, I explored what pedagogical practices might be developed to support textile design students through a digital reflection while also understanding the study participants' views regarding the effect of DRP on creativity in textile design studio practice.

Thematic Analysis was used to extract code and themes. Five themes emerged: p*erception of digital reflective practice (DRP)*, c*hallenges and issues in the implementation of DRP,* p*erception of creativity, the effect of DRP on students' creativity and prospects of DRP in textile design studio courses.* Originality, novelty, and problem-solving skills are some of the ideas related to creativity by most participants. Most participants discussed that creativity is enhanced when students practice digital reflection. DRP affects consciousness, awareness, expression, and personation during textile design development. DRP helped students to do meaning making by revisiting their thoughts and work. DRP also supported understanding the task and concept development. Results also indicated that DRP could be easily incorporated with the textile design studio practice but requires the training of educators and students to use digital tools for recordings and reflection.

Present research concluded that using digital tools for reflection in textile design studio courses could enhance students' creativity and understanding of the tasks and concept development. Appropriate resources should be allocated to encourage digital recordings and video reflections. Digital learning and teaching positively influence self-directed & agile learning and promote flexible learning methodologies. The use of digital media can also play an influential role in teamwork and collaboration but require conceptual clarity from teachers. Digital communication cannot be an alternative to face-to-face learning, so teacher mentorship can play an essential role in helping students engage with more sophisticated technology for digital reflection.

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List of Acronyms

Acronyms	***Explanation***
AVRs	Audio and video recordings
DRP	Digital Reflective Practise
ELT	Experiential Learning Theory
HEC	Higher Education Commission Pakistan
HOD	Head of the department
NTU	National Textile University
RP	Video enhanced reflective practice
VERP	Audio and video recordings

Definition of Terms

Keywords are important words/concepts related to the study or thesis. It was also critical to define terms associated with the present study by considering the research objectives (Mil & Henman 2016). Keywords are determined according to the scope of the research and help the reader identify the researcher's intention in further explanation.

Creativity: The creativity defined for the present research is a phenomenon, including the origin, process, and product. It is an everyday activity rather than a rare case of genius, and it relates to creative problem-solving or problem-solving for ill-defined situations. The essential components that distinguish creativity from other phenomena are the novelty and appropriateness based on the social context and personal beliefs (Amabile, 1996; Amabile, Conti, Coon, H., Lazenby, J., & Herron, M. 1996; Csikszentmihalyi, 2001; Dacey & Lennon, 1998; Gurcum, 2017; Maitland, 1976; Marakas & Elam, 1997; Plucker, Beghetto, & Dow, 2004).

Reflection: Reflection is the process of engaging self-inattentive, critical, exploratory, and iterative interactions with one's thoughts and actions and their underlying conceptual frame to change them and with a view on the change itself. Reflection means looking beneath the surface to find the truth about something and conclude by building new knowledge (Nguyen, Fernandez, Karsenti, & Charlin, 2014, p.1182).

Reflective practice: Creative, self-critical, and imaginative investigating process wherein practitioners consider the effects of their decisions on their situated practice to improve those practices (Tripp & Rich, 2012). In the present case, student designers are practitioners, and the design process is their practice.

Digital reflective practice (DRP): DRP refers to recording reflection with a digital medium (Coffey, 2014). In the present case, it was audio and video recording. DRP also includes reviewing personal practices and observing processes recorded during design development. 'As most of us use smartphones with built-in audio and video recording functionality, it is often as quick to make a short recording as it is to type up notes' (Coffey, 2014, para,12).

Textile design studio course: Studio-based learning is critical to university design programs (Schon, 1985, 1987). This approach is based upon a pedagogical model in which students are given a design problem to solve by themselves or in small groups and then present their work and solutions to instructors and experts for their review and critique (Cennamo, 2016; Green & Bonollo, 2003; Lackney, 1999; Shraiky & Lamb, 2013).

Chapter 1: Introduction

The Pakistani textile industry provides basic needs, the primary requirement of clothing and products for industrial and household uses. About 15 million people work in textile manufacturing, marketing, and research and development. Within a year, many different patterns, designs, weights, and fabric textures are produced for apparel manufacturers, amounting to approximately 30% of the 49 million workforces of the country. This sector contributes 9.5% to the GDP of Pakistan (Memon, Aziz, & Qayyum, 2020). The textile industry is one where creativity, volatility, and change are the driving forces that spell success or failure. Therefore, the ability to anticipate and provide the suitable fibre for the right fabric for the fitting garment or home furnishings at the proper time is paramount. Fibre, yarn, method of textile construction, and finishes are all interdependent and give the finished product its final distinguishing characteristics. The textile designer should be familiar with all aspects of this fast-paced industry to provide decorative textile designs appropriate to specific fabrics and end-uses. The required knowledge for textile designers includes understanding textile and fabric construction, finishes, colour, application, and behavioural expectations (Maarit, Anna-Mari & Kirsi, 2018).

Textile design education is a popular academic discipline in Pakistan. Universities that offer undergraduate degrees in textile design claim to cover the creative and technical side of the textile. Although there are about 45 universities that offer undergraduate programs in textile design and relevant disciplines, limited data is available about student intake, alumni, and job placements. As textile design does not offer at secondary and higher secondary levels in Pakistan, students who enrol in textile design have a background in sciences and humanities and home economics in some cases (Kaddar, 2018). There are no set criteria for admission in textile design in terms of previous education. Some Universities conduct their admission test, which mostly includes drawing tests. Grade requirement for admission is also lenient as compared to other academic discipline line, Engineer, medical sciences, computer sciences, and other disciplines.

Many students in textile design opt for this discipline by chance. In the initial days of their studies, they need to become more familiar with the scope and opportunities in this field. However, there are a few institutions in Pakistan, like the National College of Arts Lahore, where students apply with their interest and passion. As there are limited seats in the NCA Lahore, applicants must prepare themselves for admission, mainly by drawing and aptitude tests (Moinuddin, 2016). The textile Design discipline is open to both male and female students. However, the strength of female students is higher than male students in Textile Design. The reason is social-cultural factors. Generally, it is considered that textile, clothing, apparel, and fashion design are associated with females (Kamran, 2021). Students came from a diversified background in terms of their previous education and level of interest in creative art disciplines. Some students are skilled and motivated. On the other side, some need more guidance and support. Textile design requires extra art material for different assignments. Some students also need help affording different art materials and the cost of fabric printing for different assignments. In collaboration with the higher education commission Pakistan, universities are trying to overcome this challenge by offering various scholarships and bursaries (Khan, Mustafa & Nawaz, 2021). However, there is still a need to address this challenge for deserving students.

In the last two decades, there have been many private universities, including some affiliated colleges, that have been offering undergraduate programs in textile design. Admission to private universities is easy compared to public sector institutions. Additionally, degree programs have been expanded to different cities, including Faisalabad, Islamabad, Gujranwala, Gujrat, Bahawalpur and many other semi-urban regions. Now students from all over Pakistan can get admission into textile design undergraduate programs (Zahid, & Kamarudin,2019). However, certain challenges are faced by the students who enrol in art and design academic disciplines. One of the major challenges is the format of education and studio practice. Most of the curriculum in textile design consists of studio courses, which can be time-consuming and require much dedication. Most of the students came from a

traditional education system that is based on theoretical knowledge and cramming. Balancing academic and personal life can be a challenge for students, and they may face stress and anxiety, particularly at the beginning of the degree program (Hayat, Hussain, Khan, & Javed, 2022).

Besides compulsory courses like Islamic studies, Pakistan Studies and English, Students study three types of courses in textile design education degree. Curriculum included theory courses, technical textiles courses, and practical courses (i.e., studio practice). Most of the students focus on studio base courses because it is a general perception in Pakistan that textile designers need practical skills in drawing, design development and computer-related courses. With the development of technical textiles and their market demands, textile technology courses are added to the textile design curriculum. However, not all universities in Pakistan have state-of-the-art facilities for textile design students. A lack of facilities and infrastructure can hinder the learning process and limit students' creative potential. It may lead to frustration among students as they cannot produce the desired results (Zahid, & Kamarudin,2019).

Pakistan has a competitive textile industry, and job placement for graduates is challenging because, in many cases, graduates need to be more practically familiar with the latest technology in textile production. Most designers work as print designers for apparel and home textiles. Agordah (2016) considered that there is a margin for textile designers to work in different roles in the textile industry, including functional textiles, high-performance textile material, and textile product designs. To explore new ventures and job opportunities, universities and the government must invest in the latest technology and equipment for textile design education. Additionally, many female graduates in textile design do not pursue their careers because of the social system of Pakistan. Many Pakistanis consider that women should bear the home and children's responsibilities despite their interests and qualifications (Zahid, & Kamarudin,2019). There is a need for appreciation for female graduates to pursue their careers. Moreover, job opportunities for graduates need to be increased to encourage students to pursue textile design as a career.

I mentioned before that about forty-five institutions in Pakistan offer an undergraduate degree in textile design & related disciplines. Most courses are based on studio practice in the textile design curriculum. The design studio practice utilizes authentic, real-world tasks and examples in a creative and collaborative environment to prepare students for ongoing collaborative tasks in their careers (Boling, Schwier, Gray, Smith, & Campbell, 2016; Sawyer, 2017). Senbel (2012) found that design studio teaching draws from constructivist, experiential, and social learning theories. Constructivist and experiential learning theories state that students learn by discovery, personal experience, and interaction with the educational environment (Matriano, 2020). Personal creativity is one input of a creative artefact. Researchers have described it as a complex product of several interacting components: intelligence, cognitive ability, style, personality, motivation, knowledge, and environment. Personal characteristics, cognitive abilities, and social environment can impact creativity and a product or artefact (Gurcum, 2017). Students' creativity and process performance in a design studio are related. Creative students were likelier to perform well in process-related tasks and interact with the other students in the class (Sandra, da Silva, Giuseppe, João, Pereira, Regina, Held, Leandro, & Victor, 2017). Chang (2019) deliberated on the positive relationship between interactivity and learner's reflection, that it creates an association of learners with the process and results.

Sadik (2021) discussed some common issues related to art and design education in Pakistan. According to Sadik (2021), art and design education in Pakistan is more material dependent, and less attention is given to idea generation and concept development. Technical aspects of various related disciplines like architecture and industrial designing also ignore in the foundation course of creative arts. Sadik (2021) stressed that Pakistani design education should emphasize holistic and situated pedagogies practised in different art and design institutions worldwide. Gouhar (2022) discussed the gap between industry and academia, particularly in the art and design education sector. Initiatives for curriculum

development and implementation are required to enhance graduates' employability. The pace of industrial progression is fast as compared to advancement in academia. Gouhar (2022) suggested that students should be trained to work in an integrated learning environment. This integration could be done through co-curricular applications and curriculum-embedded tasks. Students, teachers, institutes, industry, and government must watch this latest trend and create as many opportunities as possible. Art and design education should include industrial visits, workshops, and updated software.

Faizan, Munir and Noman (2013) identified some critical aspects regarding the prevalence of art education in Pakistani society. A limited number of textbooks are available, and the curriculum needs to be updated to meet contemporary challenges. The religious side of the culture does not support the art practice, which limits the expressive side of the arts. Besides the obstacles associated with implementing curriculum and freedom of expression, Pakistani education settings lack human resources for curriculum planning and implementation as teachers and mentors. Answer (2022) discussed that art and design education teachers are not reflective practitioners. Though challenges in critically reflective practice are multifaceted external factors play a vital role in developing a critically reflective practice culture in academic institutions. Reflective practice in Pakistani institutions holds ample opportunities to explore its effect on different aspects of Pakistani art and design education (Anwer, 2022).

The practice-based approach is the foundation of textile design education, and creativity drives the textile and apparel industry. Besides practical work, designers should be aware that improvement often requires designers to transform rather than add to their practice, involving a shift in beliefs, knowledge, and habits. This need exists for all designers to reflect on practice meaningfully to plan for and apply improvements in practice strategically. One practical approach to reflective improvement in practice is taking an inquiry towards the design process. Inquiry is a systematic process that facilitates systematic reflection. Taking an inquiry enables designers to reflect on critical approaches in a structured, open-ended manner (Valentine, Ballie, Bletcher, Robertson & Stevenson, 2017).

Several authors argued that reflection had been researched from the instructor's perspective as an instrument for grading, assessing, and providing feedback on student work (Ahmed & Al-Khalili, 2017; Impedovo & Malik, 2015). There is an opportunity for research into exploring the effect of digital reflective practice (DRP) and assessing the creativity of undergraduate textile design students. Divergent or open-ended tasks, such as those found in a design studio environment, are more challenging to assess than assignments with a single correct or best answer due to the complexity and abstraction of the work and its assessment on multiple criteria (Powell & Carroll, 2013). Examples of divergent tasks are design products, artefacts, or performances. Divergent tasks allow students to demonstrate cognitive abilities, integration of knowledge, and innovative action. This research explores whether implementing digital reflection activities, focusing on audio and video recording of work in an undergraduate design studio class, will impact students' creativity.

1.1. Textile Industry and Textile Design Education

Before understanding textile design education, one should know about the textile industry because most graduates are positioned after completing the degree (Khan & Khan, 2010). Consumer demands for textile products change rapidly compared to other sectors. Globalization also enhanced the pace of change in the textile industry, and new designs based on appearance and functionality are introduced every season. (Eckert & Stacey, 2014). The internet, computers, and other digital tools have played an essential role in communication and management. Digital tools have also accelerated the supply chain process in the textile sector. Computers considerably impacted how the textile industry operates (Papachristou & Evridiki, 2015). Besides the remarkable impact of digital

technologies in many disciplines, the role of computers is limited to motif development in the textile education of Pakistan. Many aspects of digital technologies need to be explored or discussed in many academic disciplines, including art and design education in Pakistan (Kundi, Shah, & Nawaz, 2018).

The industry blamed the universities for offering textile design programs without considering the market or industry requirements. Universities need to work on employment opportunities for textile design graduates, and most of the time, textile design programs are offered to generate revenue (Kaddar, 2018). There has been tension between industry and the designer's technical knowledge, and there has always been a debate between industry and academia relating to graduate skills (Arubayi & Obunadike, 2011). There needs to be more debate about pedagogy or teaching techniques, such as how textile design students can acquire new skills according to market demand. It is also discussed in the textile design education sector that many universities that offer textile design courses focus on the aesthetical side of designs and ignore that technical and production viability (Kylie, 2010). Reflective practice is essential in learning new techniques, as 'reflection as a critical component of the technology adoption process' (Hromalik & Koszalka, 2018, p. 530).

There is a gap between theory and practice in design education (Sandra, da Silva, Giuseppe, João, Pereira, Regina, Held, Leandro, & Victor, 2017). Several academic journals and papers have been published related to the technical side of textiles, from yarn manufacturing to garment production and marketing. Conversely, a limited number of citations and indexes have produced no more than a handful of documents, usually relating to conference proceedings or government policy relating to the textile design curriculum (Kaddar, 2018). National Textile University (NTU) is one of Pakistan's leading and oldest textile institutes, offering textile design and engineering degrees. Few published works are evident in design compared to textile technology, engineering, and marketing (Research Publications, 2020).

Farrukh (2018) discussed the challenges and limitations of Pakistani Art and Design education. A balanced curriculum can only be achieved with industry collaboration and linkages. Pakistani Art & Design education sector is still stuck to traditional pedagogy (Farrukh, 2018). A narrow curriculum with conventional ways of planning and execution also limits the students for their readiness according to industry demands (Moinuddin, 2016). Moinuddin (2016) suggested that greater investment is required to overcome the prevailing challenges of Pakistani Art and Design Education. One of the prominent issues is the need for more funding and financial aid. This scenario leads to defending the equipment required for experimentation, innovation, and progression, as Moinuddin (2016) mentioned. Farrukh (2018) pointed out that education should take relatively inexpensive initiatives. Academia-Industry linkage should be prolusory measures from the academia. This linkage will reduce the gap between theory and practice. This collaboration will benefit the students by preparing them for practical knowledge and help the industry develop creative ventures for the economic growth of the industry and the country (Research Publications, 2020).

Kaddar(2018) deliberated on the curriculum planning of textile design education in Pakistan. The higher education commission (HEC) of Pakistan provides guidelines for the curriculum. However, industrial representation needs to be included in the curriculum planning committee of HEC. Curriculum planning methods trickle down from the HEC curriculum committee to the Board of studies of the universities. Most of the time, involvement of industrial stakeholders is symbolic. Industry output in curriculum planning is not active (Kaddar, 2018). The bridge between theory and practice can be created by training educators about the protocols of collaborations and giving applied importance to industry feedback. Art and design higher education in Pakistan requires addressing curriculum limitations, industry collaboration, and resource constraints. By investing in resources, fostering industry-academia partnerships, emphasizing practical skills, and upgrading technology and

equipment, institutions can better prepare students for the demands of the industry and bridge the gap between theory and practice (Farrukh, 2018; Moinuddin, 2016; Kaddar, 2018).

In the scenario of the Pakistani textile industry after 2000, the kit of the professional designer included online tools and sources parallel to the manual skills. Developing aesthetics and technical knowledge is needed for the designer's professional growth. Technology upgrades frequently, and every time a designer needs to learn something new to catch the pace of industrial change. The aesthetic aspect of textile design is also a dynamic phenomenon, and the designer must be aware of changing trends in the market and industry (Cassidy, 2019). Textile design student needs a skill or temperament to adopt new technologies through self-learning or continuous learning. Reflective practice relates to self-analysis and continuous learning (Klimova & Poulová, 2014; Xhaferi & Xhaferi, 2016). The notion of continuous learning developed my interest in the reflection in action and reflection on action.

While many textiles designers' work is creative, "Designers are challenged to show an understanding of culture, economics, lifestyle, and global mobility in every step in their creative processes" (Kemp-Gatterson & Stewart, 2009, p. 119). They must also learn and understand the economic and political world along with production-related knowledge. Kemp-Gatterson & Stewart (2009) listed history, economy, society, culture, and politics as textile designers' inspiration sources for creativity and the marketing aspect of understanding consumer needs. Moreover, a solid understanding of world events will help product developers clarify how and where products should be manufactured in this marketplace of growing global integration. The continuing globalization of all industries will impact product sourcing and production out-sourcing. Trade and global changes impact textile companies, as does the political climate in the countries acting as trade partners (Burns & Bryant, 2007). Burghardt and Hacker (2007) suggested that most problems assigned in the classroom are well-defined. All the parameters are specified, and only a little is left unknown. Open-ended problems are uncommon. However, this pedagogy has a few known things that could be improved.

Burghardt and Hacker (2007) suggested that this design pedagogy focuses more on the product than the learner, placing more emphasis on assignments than the student. Also, this design pedagogy focuses more on trial-and-error practice than conceptual industry standard-based learning. Burghardt and Hacker (2007) theorized a new process called ‘informed design’ to solve these issues. Burghardt and Hacker (2007) offered a few suggestions first. One is to start with ideas broadly and narrow them down to specific topics as necessary. This narrowing allows for more pluralistic learning and for students to reflect on their worldviews by forcing students to evaluate the problem as a whole and define their conceptualization of the problem. Lastly, informed design is suggested to integrate a more scientific approach to art and language learning and engages students to control their learning more. ‘Informed design’ is intended to encourage students to use their current knowledge base to understand and develop an idea to design a product. This challenges students to refrain from using a trial-and-error approach and to centre their designs on logic and science. Burghardt and Hacker (2007) suggested that ‘Informed Design’ facilitates research, analysis, and inquiry more so than current design pedagogy. It helps foster a better student-professor relationship by encouraging an inquisitive mind within students.

Creativity is conceptualising or producing something novel and valuable (Runco & Jaeger, 2012). Jonson (2005) defined *design ideation* as "generating, developing and communicating ideas, where 'idea' is understood as a basic element of thought that can be either visual, concrete or abstract". We adopt this definition, except that we distinguish it as separate from communication, though it may co-occur with communication. Research in creativity and ideation has been studied from several different perspectives. Psychology and cognitive science typically look at creativity concerning the person, focusing on influences such as personality motivation and environment (Amabile, 1996), cognitive mechanisms, and cognitive neuroscience (Akin & Akin, 1996). My interest was not so much in the

intrinsic characteristics of exceptionally creative persons. I took the stance that all people can be creative, and I want to find out how reflection effect creativity.

In design, a common approach is to use systematic methods to study the creative process and is often restricted to isolated, traditional techniques and practices such as the Theory of Inventive Problem Solving (TRIZ) (Savransky, 2000; Hernandez, Schultz, Estrada, Woodcock, & Chance, 2013), brainstorming (Diehl & Strobe, 1987; Sutton & Hargadon, 1996; Furnham, 2003), the use of analogies and metaphors (Dahl & Moreau, 2002), and sketching (Jonson, 2005; van der Lugt, 2005). Additionally, even the most widely practised and promoted activities, when tested over time, have only sometimes stood up to the acclaim they have received in corporate and academic spheres. The results of research on brainstorming, for example, have yet to be consistent and have even indicated a diminished value in using this practice over time (Sutton & Hargadon, 1996). A third, situated practice-based approach also examines creativity through a more complex contextual lens. This approach includes studies of environmental factors designers in practice (Schon, 1987; 1991), discovery processes and psychological states of creative people (Csikszentmihalyi, 2014).

While some researchers, such as Csikszentmihalyi (2014), studied creativity from many different angles, most overlook the broader range of activities and factors accompanying ideation. Even in the third approach, there needs to be more in investigating reflective practices collectively to explore and discover relevant underlying characteristics. Furthermore, despite the shared experience of being struck by an idea while in the shower or while walking, there still needs to be more research that seriously considers and examines the much wider variety of informal activities that form the backdrop to creative ideation. Additionally, the use of digital tools should be included in the reflective process and its effect on designers' creativity. I plan to fill this gap in the present study by exploring the digital reflective practice and the contextual characteristics that accompany and form the backdrop for creative creativity in design. Through this research, I explored the effect of digital reflective practice, which designers engage in when they get creative ideas related to aesthetics and the technical side of design.

1.2. The Rationale of the Study

Verbal reflection is essential in textile design pedagogy and studio practice. Textile design assignments are planned so that students are required to reflect verbally on their practice, and most of the time, their discussion on design affects the evaluation and assessment. Students work in an active and collaborative learning environment in the textile design studio course, and continuous interaction with the instructors is a critical factor in textile studio design. Students show the progress of the work and brief about their problems and plans for the next step. Teachers guide them at different stages of design development. At the end of any task or sometimes in the middle of work, students also share their creative process with the instructors in visual reflective journals(sketchbooks) and sometimes written reports (Savolainen, Leppisaari, & Niinimäki, 2018). Written reflective journaling is considered time-consuming, and students face difficulty, mainly if it is done by the end of any assignment or task. The convenience of video and audio recordings can make the process more expedient. However, because the digital reflection was created differently, there will also be apparent differences between the written word to instructors. Besides the accepted significance of reflective writing in students' learning, it is not popular in art and design (Louis, Remon, Sylvia, Elise, John & Engbert,2019). Even textile design teachers do not feel comfortable with reflective writing. Designers might be good practitioners but are not comfortable with the conventional process of reflection and documentation of the teaching process (Louise, Jen, Joanna, Sara, & Frances, 2017). Some of the factors are further discussed in the literature review. The introduction focuses on the aspects related to Pakistani textile design higher education.

The general concept of reflection relates to writing and reflective journals (De Caux, Lam, Lau, Hoang, & Pretorius, 2017). The culture of reflective writing does not exist in Pakistani universities (Chaudary & Imran, 2012). The medium of instruction in Pakistani higher education institutions is English. Nevertheless, English is still challenging for teachers and the student community (Ali,2015). Fear of writing in English exists more in the technical domain, including fine art and design. No research journal related to art & design education in Pakistan has been found. This gap in academic research in Pakistani art and design education presents an opportunity to contribute to this area.

Communication skills are critical for reflection or for being a reflective practitioner. On the other hand, Barley (2012) emphasised thought processes or attitudes more. Reflection is a dialogue that could be done as self-talk or by external conversation; for that, one should have words to articulate convictions. Engaging in dialogue enables the learner to make their ideas explicit. High-quality discussion requires a sound underpinning vocabulary of general and specific terms relating to the subject domain (Liu, 2017). Dialogue enables the student to communicate with the experts in their field and express their intentions in their designs. As I mentioned, reflective dialogue is the common practice n textile studio design education. Still, there should be more to using any documentary medium (written or audio/video recorded) for reflective practice. Considering the limitation of written reflection in design education, I used digital audio and video for reflection in textile studio design.

Video has been a powerful medium of instruction since the birth of television, but its everyday use in education is increasing because technology now makes it easy (Woolfitt, 2015). Educational technology has undergone three stages and is now in the midst of a fourth due to the birth of digital communication spearheaded by video (Gasevic, Dawson, & Siemens, 2015). Video in education can be categorized into three functions: demonstrating, narrating, and lecturing. Fernandez, Simo, Castillo and Sallan (2014) noted that only cursory research had been paid to videos in online discussion boards, whereas much appears around the use of video in distance learning. Recent technological developments in digital recording ushered in the digital video tools era, allowing non-professionals to produce their videos. More recently, streamed video technology evolved, allowing viewers to open webpage hyperlinks and view the video on demand (Fernandez, Simo, Castillo & Sallan, 2014; Woolfitt, 2015).

Video is now fast and easy to produce, and technological progress will only make it easier (Woolfitt, 2015). According to Fill and Ottewill (2016), streamed video is advantageous in higher education and is used there in two ways: as a learning tool or resource students can view; and as a content delivery system from teachers to students. Advantages include the ability for students to control viewing; the ability to cut the video into shorter sections; the ability to include video in other multimedia; the ability to speed up some processes; and its relative cost-effectiveness and efficiency (Fill & Ottewill, 2016; Woolfitt, 2015). The video was seen to provide ' a psychological state in which virtual objects are experienced as actual objects in either sensory or nonsensory ways' (Lee, 2004, p. 27). Notwithstanding these advantages, as with all technology in learning, the video should be used effectively to be beneficial (Bransford, Brown, & Cocking, 2000). Because video for reflective purposes is an emerging phenomenon, research is nascent, varied, and inconclusive.

Video recordings have added a new dimension to encouraging and sustaining individual and collective reflection. Video cases have been integrated with teacher education and professional development. However, most studies involving video footage to encourage reflection have been conducted with the teachers. Most of the previous research endeavours involve examining the use of video from a teacher's perspective and examining video footage to prompt reflection using scripted video clips (Hamel & Viau-Guay, 2019). The current study aims to explore the effect of digital audio and video reflection on the creativity of undergraduate textile design students and emphasizes the student's experience using digital audio and video tools for reflection.

Video for reflection is critical in understanding its potential impact on the creativity of textile design students. Video reflective practice enables the practitioner to observe, analyze, and evaluate their own work or processes. Video reflective practice has been experienced in different academic and non-academic disciplines, including applied sciences, sports, and creative arts (Coffey, 2014). In the context of creativity and design, researchers have delved into the potential advantages of using video as a tool for reflection. The incorporation of video for reflection adds visuals to the thought process of students that help them to gain a better understanding of their design process, techniques, and problem-solving strategies (Lousberg, Rooij, Jansen, Dooren, Heintz, & Zaag, 2020).

Liang and Hong (2016) deliberated that video reflection positively impacts self-awareness and the practitioner's critical thinking. Watching their own videos during reflective video practice helps students to review their work from a different perspective, enabling them to identify patterns, biases, or areas that require improvement. An objective analysis of their videos enables students to revisit their design decisions and evaluate their significance. Creative choices are linked with self-awareness that could be achieved through video reflective practice. Moreover, reflective video practice encourages students to engage in metacognition, which involves thinking about one's thinking. When reviewing their design process through video, students can articulate their thoughts, emotions, and intentions more effectively (Liang & Hong, 2016). Parallel to intrinsic and intellectual change, reflective video practice promotes active engagement and collaboration among students and peers. By sharing the video, one can have constructive feedback, alternative perspectives, and suggestions for improvement. This environment can be interactive, and learning can be done through another's experiences.

A literature review demonstrated an opportunity for research using digital reflective practice (DRP) in a textile design studio. The present study will benefit textile and apparel design instructors and students by exploring possible improvements in using digital reflections in studio practice. The outcomes of this research will add to the theory of reflective practice in textile design education and provide a deeper understanding of Pakistani textile and apparel undergraduate education. The role of digital reflection during the design development process was evaluated to explore whether a DRP that explicitly states expectations for the quality of course components, such as creativity, impacts students' perceptions. The following key questions were addressed in the present research.

Research Question(s):

1. *How do design students and educators perceive digital reflective practice?*
2. *In what ways do design students and educators perceive the relationship between digital reflective practice and creativity?*
3. *How do design students and educators view digital reflective practice can be used more effectively in textile studio practice*?

1.3. Theoretical Framework on Reflective Practice, Design Pedagogy, Creativity

Reflective practice (RP) is considered a popular concept in education and many other academics and non-academic discipline, and there is a tremendous volume of material relating to reflective practice. (Hasenstab, 2018). Reflective practice is rooted in the contributions of Dewey and Schon (Hébert, 2015). Watts (2019) indicated the need for the reflections to be critically grounded, rigorous, and methodical. O'Brien (2016) discussed that reflective practice is a tool for professional growth. According to Jue and Hee (2020), professional growth includes personal growth and a research vehicle for improvements in education in the individual classroom and, ultimately, improvements in general education. RP is a tool for professional growth in two well-recognized areas. It includes the development of a curriculum for better student learning and professional development, where the teacher develops and assesses strategies in their daily practice (O'Brien, 2016). It extended into

research that informs educational practice in the broader context of society (McNiff, 2019). An adequate amount of literature shows the effectiveness of RP in teaching and other areas of education. Some of these ideas are discussed in the literature review section.

Pedagogy in art and design was described in Schon's (1987) work on the reflective practitioner, which examines the architect's training (Priya, Prasanth, Prince & Peechattu, 2017). In textile design studio courses, the instructor usually gives a task to the students based on the aesthetical or technical problem. Students go through the developmental procedure and interact with teachers and peers in the journey of progression. Evolution is a critical part of textile design education. Display and continuous critique enhanced the quality of art and craftwork. Mass participation and the impact of technology have a continued effect on what is being taught in the studio design curriculum and its delivery (Groth, 2017). Various models discussed the concept of creativity in terms of formal learning. The four-stage model informs the present study of creative reflection: 'preparation, play, exploration, and synthesis' (Tracey, 2011, p. 3–5). Reflective practice significantly impacts creativity and critical thinking among students (Slade, Burnham, Catalana, & Waters, 2019; Janis & Samantha, 2017; Donna & Holly, 2016; Bell & Mladenovic, 2015). When ideas of reflection are implemented in university classrooms, students transition more easily in class, are engaged in the learning process and process information and experiences. Reflection decreases stress and improves creativity (Salvik, 2014). Students learn best through mindfulness awareness of distinctions and broken down into mindful tasks. Attention and knowledge are dynamic when reflection skills have been learned.

Journals are potential means for the development of reflective practice. Anecdotal, theoretical, and empirical support exists in the writing and literature for journal writing to stimulate and track reflection (e.g., Lakshmi, 2014; Bashan & Holsblat, 2017). Changing scenarios in higher education worked as a catalyst in transforming reflection from journal writing to documentation or expression through digital technologies (Kirk & Pitches, 2013).

The works of John Dewey and Donald Schon serve as frameworks that scholars have referenced to understand the reflective practice and its use across many disciplines. The present study also used Dewey and Schon's reflective practice model. For this study, reflective practice is defined in modern terms as a process which allows textile design students to think systematically about the design process and learning (Dewey, 1938) and to learn (and react) from experience (Schon, 1987). Dewey (1938) defined reflective thinking as "active, persistent, and careful consideration of any belief or supposed form of knowledge in light of the grounds that support it and the conclusion to which it tends" (p. 9). He defined *reflective thinking* as having six aspects or phases, which are repeated as necessary: The experience of a task, the reflection of the experience forming questions, attempting to come up with possible solutions to the questions, constructing and testing a hypothesis, testing of hypothesis, or imaginative action, and taking a new plan of action.

Donald Schon's theory of reflective practice gained prominence fifty years after Dewey, emphasising context-based experiential learning. In this study, his three types of reflective practice are central to analysing our personality's role in our perceptions and resulting behaviours in the classroom. In professional education, Schon's seminal work 'The Reflective Practitioner' (1983) is one of the most quoted books on professional practice. Schon's work has enormously influenced numerous professions regarding reflective practice across many disciplines. Schon has three types of reflective practice that will be focused upon in this study. They are knowing-in-action, reflection-in-action, and reflection-on-action. Knowing-in-action, or motor skills and natural behaviours, are daily processes without formal planning. Reflection-in-action occurs while the practitioner works, and an unexpected problem or outcome occurs. Reflection-on-action allows practitioners to reflect on previous experiences to realise how their actions may have contributed to an unexpected or undesired outcome (Schon, 1987). Reflection-on-action occurs after the event takes place and is when past events are reviewed to examine them for improvement and assessment. Reflection-on-action allows

the practitioner to make sense of actions taken, to consider the context and consequences of those actions, and to intentionally learn from the experience. Thus, reflection-on-action can lead to a change in future action (Charlene, 2020). Typically, this type of reflection includes journaling, reflective discussions, and or descriptions in a portfolio and is generally the type of reflection most people understand. However, while less understood, reflection-in-action is more relevant to practitioners. Digital audio and video recordings were used as a tool for reflection in action and reflection on the action.

Summary of the Chapter

The textile industry has significance in the socio-economic development of Pakistan. Higher Education institutions strive to produce a skilled human resource for the textile sector through approximately 45 undergraduate programmes in textile design & related disciplines. Creativity is considered a critical skill in the discipline of textile design. Reflection and reflective practice are well-received ideas in education. Despite the expected positive outcomes of reflective practice, there needs to be more aware of RP in Pakistani textile design education. Written communication skills and critical thinking are reasons for the unsubstantial use of reflection in Pakistani higher education. Most of the studies on textile design and reflective practice derive from teachers' experience of reflection. The present study explored digital reflective practice by textile design students in their studio design settings. The textile industry's requirements are continuously changing, and students have required an aptitude for continuous learning to upgrade with new trends and technologies. Digital media gained popularity in every domain in Pakistan in the last decade. Textile design students use the internet and other digital tools in their studio assignments. Instead of the traditional reflection method (i.e., journals and portfolio), digital audio and video recordings are proposed for reflection. The study explored the effect of DRP on the creativity of Pakistani undergraduate students in textile design. The presented research also identified areas in the textile design studio course that DRP can improve. The study was a departmental case study based on multiple case study methodologies in four departments of four different institutions. Before presenting the results of this study, it is essential to understand the concepts related to textile studio design, creativity, reflective practice, and digital video tools for reflection.

Chapter 2: Literature Review

The literature review aims to enhance the understanding of the concepts related to research questions. Digital reflective practice is one of the highlighted phenomena of the present work. Digital reflective practice is a concept discussed in the historical and contemporary context. The idea of reflection is also concerned with its relation to studio design education, creativity, and videography. Creativity is another critical aspect of the present study. Creativity is an independent phenomenon, and the literature review also elaborates on creativity concerning studio practice. The previous section introduced these concepts and discussed the purpose of conducting this study. This section expands upon these broad concepts by discussing past literature to create the foundation for the current study. General concepts will lead to more specific ideas, discoveries, and notions about creativity, reflective practice, and textile studio design. I summarize by synthesizing the current literature findings and providing an overview that clarifies where the present study is situated to the reader.

For the literature review, I started with the basic idea of reflection and reflective practice and then narrowed down the idea to studio design and reflection. A key concept of the presented work revolves around digital video reflective practice, so discussing the digital reflective practice (DRP) in past and present scenarios was essential. The present study also discussed the views of educators and students about DRP in the context of creativity. So, the idea of creativity and studio practice was also discussed in this section. To discuss the effectiveness of DRP in textile design studio practice, it was also essential to elaborate knowledge and skills required for textile studio design.

2.1. Reflection and Reflective Practice

In the context of improving instructional practice, the word “reflection” references the intense study of practice with breadth and depth. Dewey (1938) explored the concept of reflection in the early 1900s. According to Dewey (1938), reflection must go beyond routine action in response to situations that arise in the classroom. Reflection must include viewing an issue from multiple perspectives with an open mind; reflection must consist of responsible action with a clear understanding of the consequences of actions taken; reflection must include a total effort to take control of practice in the face of bureaucratic barriers or criticisms. Building on Dewey’s definition, Zeichner (1981) defined reflection on practice as an integration of attitudes and skills in the methods of inquiry. Rodgers (2002) (also cited by Kayapinar, 2018) draws on Dewey to go beyond a basic definition of reflection and describes four components of reflection: reflection is a meaning-making process that involves building knowledge and understanding based on previous experiences and ideas; reflection is a systematic way of thinking based on inquiry; reflection is most effective through collaboration and interaction with others; reflection requires the valuing of professional growth of self and others (Rodgers, 2002, Kayapinar, 2018). By clarifying what reflection is, students can better understand how to use reflection in a productive way to improve their practice.

For Dewey (1938), the learning process transforms the concrete experience into purposeful action through a complex intellectual operation involving:

1. Observation of surrounding conditions
2. Knowledge of what has happened in similar past situations
3. The ability to judge and interpret what is observed and recalled

Forming purposeful action based on these three interrelated functions is essential to creating an educational experience in contrast to a mis educative experience. Action is not the same thing as experience, and experience comprises two interlinked dimensions: doing and the consequences of

doing. When we consciously consider and reconsider the consequences of doing, we learn from the experience. Learning for Dewey is a rational cognitive process initiated by impulse, directed by observation and judgment, during which assessing actions' consequences leads to new notions in a continuously progressive spiral. The role reflection plays in this process appears for Dewey (1938) as an 'active persistent and careful consideration of any belief or supported form of knowledge in light of the grounds that support it and the further conclusions to which it tends' (p. 6). According to Dewey, reflective thought begins in response to situations interpreted as puzzling, ambiguous or presenting a dilemma. It involves suspending one's judgment long enough to search or investigate possible courses of action. Reflection requires exploring one's experience, prior knowledge, and further observations to evaluate evidence that will support one course of action over another (Zhao, 2014).

According to Kolb (1984), Dewey's thinking about experience as the organizing focus for learning is one of the cornerstones that undergird experiential learning. Kolb, to create a "holistic integrative perspective on learning that combines experience, perception, cognition and behaviour" (p.21), incorporates Dewey's pragmatic and progressive orientation along with Lewin's (1951) phenomenological perspective from Gestalt psychology. For Kolb (1984), 'learning is the process whereby knowledge is created through the transformation of experience' (p. 38). For Kolb (1984), the learning process involves a four- stage learning cycle which, Kolb argues, undergirds all forms of human adaptation, and approximates scientific inquiry. It begins with the learner having a concrete experience, then reflecting on this experience, conceptualizing it, developing general principles, and finally testing them. Kolb asserts that when we grasp substantial experience and transform it through reflective observation or active experimentation, we transform experience as apprehended or comprehended, thus creating knowledge. This dynamic relation between apprehension (perception) and comprehension (cognition) is dialectic and transcendent in that the results develop new knowledge and progress towards a higher truth. Experiential learning is marked by increasing complexity when dealing with the world as one progresses towards higher levels of integration, grasping and transforming experience into knowledge.

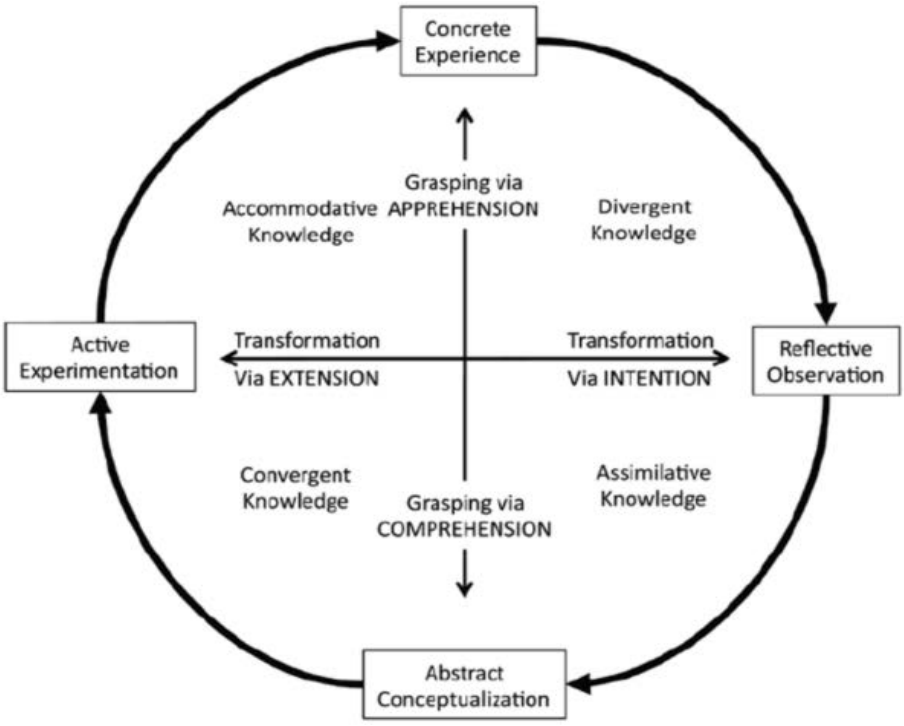

Figure 1: Experiential Learning Theory by Kolb

There are two principal ways of transforming experience. Active experimentation involves intentional action directed externally. It focuses on influencing people and changing events and implies a pragmatic functional, and heuristic approach to problem-solving. In contrast, reflective observation involves sensory awareness directed internally. Reflective observation stimulates memories and feelings and concerns what is true and how things happen. It focuses on understanding through impartial description and intuition, distances one from the here and now and requires a critical, analytical, and objective posture that broadens the range of choice and deepens one's ability to sense the implications of action (Kolb & Kolb, 2017).

Jarvis (1987) expanded Kolb's definition of learning and asserted that learning transforms the experience into knowledge, skills, and attitudes through various processes. (p. 8). He posited a model of learning, like Dewey's (1938), in that it accounts for how changes in the learner might affect their response during an experience and how these changes affect the phenomena that one learner is experiencing. Like Kolb (1984), Jarvis acknowledged how different approaches to knowledge produce other learning processes and builds on Kolb's learning cycle but add a level of complexity. The learning process for Jarvis existed within the context of a nine-step cycle of possible responses a learner may have in a situation. These included non-learning reactions like presumption, no consideration or rejection (Moon, 1999; Charlene, 2020). Jarvis (1987) argued that the person, made up of mind, self and body, is acquired through social living and is a significant factor in the learning process. Jarvis (1987) drew heavily on Mead's thinking in building this argument, finally asserting that consciousness is a result of social behaviour, and that the emergence of consciousness is linked to the development of the mind. The mind and the self are construed as social constructs that emerge through experience and social interaction. What was most significant for Jarvis in the self-concept is its ability to pose questions of meaning that focus on the unknowns of human existence and construct systems of meaning with others.

For Mezirow (1991), reflection is becoming aware of our taken-for-granted assumptions and philosophies, including our roles and psycho-cultural beliefs, which allows us to recognize our culturally induced dependency on these roles and relationships. Becoming aware of our assumptions and their reasons for allowing us to take action to overcome them. Becoming aware of our awareness is critically reflecting on these instinctual urges and those institutional or environmental forces constraining our lives. Reflection is a meta-reflection in which we see the world and ourselves more clearly and see ourselves seeing the world, perceive our perceptions, and are aware of our awareness. When this awareness is linked to action through reflection, transformative learning may occur (Pyhtila, Tofade, & Beardsley, 2014). Schon's (1983, 1987) principal concern is constructing a model of professional practice grounded not on technical rationality as an optimistic epistemology but rather on "an epistemology of practice implicit in the artistic and intuitive process" (Schon, 1983, p. 49). Jarvis (1987) pointed out that Schon comes to the study of professional practice as artistry, lacking a traditional theoretical educational background.

Schon (1987) described reflection-in-action as our critical questioning of the assumptions that led up to our experience of an unexpected positive or negative event, 'asking ourselves, as it were, what is this? and at the same time how have I been thinking about it?' (p. 28). Reflection-in-action then leads to restructuring the strategies of action and our understanding of how we pose our problems, giving rise to on-the-spot experiments in which we think up and try out new actions intended to solve unique issues. For Schon, experience is comprised of an individual's awareness or comprehension of sense impressions that emerge through action patterns. I emphasised the word "appear" in this interpretation, for the term experience is rarely if ever, used by Schon (1983, 1987) and never explicitly defined. The awareness that emerges through such patterns of action is implied and unspoken. It reveals a knowing-in-action or 'tacit knowing' to use Polanyi's (1967) term. Schon draws heavily from Polanyi's concept of tacit knowing, in which reality is experienced regarding subsidiary awareness. We attend to reality, not directly but through the intermediate agency of action, which offers an appreciation of experience through tools and clues. We attend from the tool's "impact on our hand

'to' its effect on the things to which we are applying it" (Schon, 1987, p. 52). This awareness is uncritically internalised and forms our tacit knowing.

No single definition of experience, learning or reflection can be drawn from this literature, but several themes emerge. First, reflection is a subprocess within learning that brings experience to bear on a present situation. It is interesting to note that Cell (1984) offered the principal exception to this observation in that reflection also can involve a reinterpretation of experience over time and from the differing vantage points that the lapse of time and ongoing experience can provide. Reflection is a means to an end; it is critical, analytical and has a significant validity-testing aspect. Reflection and learning are, for the most part, intentional and volitional processes to act on one's interest, gaining new knowledge, new meaning, new interpretations, or correcting distorted interpretations about the world and us within it.

In addition, considering the emphasis on reflection as a critical, analytical, and cognitive process, there is little opportunity, except for Schon (1987), to explore the tacit, nonverbal, visual, sensory, or auditory modes of reflection implied by Cell (1984). This is compounded by the lack of explicit definition of experience in most of this literature and the intermingling of various philosophical traditions that seem to blend Pragmatism, Humanism, Gestalt psychology, Structuralism, and Critical Theory without much consideration for how each position or tradition implies a specific ontology, epistemology, and methodology. Finally, when linked to action, reflection suggests a time-space continuum in which the individual, as initiator and interpreter, looks ahead to the future course of action or back to the past consequences of previous action, analyzes a potential course of action based on an interpretation of experience and moves ahead dialogue (Kano, Ayana, & Chali, 2017).

2.2. Design education and reflective practice

What do reflective practice and design have to do with one another? “Reflection is the process of stepping back from an experience to ponder, carefully and persistently, its meaning to the self through the development of inferences; learning is the creation of meaning from past or current events that serves as a guide for future behavior” (Daudelin, 1996, p. 39). Reflective practice is a method of reflection, as it’s defined above, “in professional or other complex activities as a means of coping with situations that are ill structured or unpredictable,” as is generally the nature of design problems (Moon, 2004, p. 80). According to Schön’s (1983) reflective practice theory, the design process can be categorized into three phases of reflection: reflection-in-action (RIA), reflection-on-action, and reflection-on-practice. Reflection-out-of-action (ROA) and background reflection represent two additional conditions of reflection that occur “outside of the context of explicit design activity” (Currano & Steinert, 2012, p. 270).

Design can also be interpreted as an approach to assessing a situation and, through experimentation and insights, inventing an idea or solution. It “has been shown to be a successful method to encourage the generation of new concepts during the front-end of innovation,” and as such, has been speculated to utilize reflection indirectly, primarily through ROA and background reflection (Currano, Steinert & Leifer, 2011, p. 1). Currano, Steinert and Leifer (2011) surmised that in ROA and reflective background activities, ‘there is a clear separation between the reflection and the design work, noted by the location (in the shower, in the park) and/or the background activity (showering, doodling, jogging), and that such activities are founts for gaining insights and productive ideation’ (p. 3).

'Design education, as we know it today, emerges from a rich tradition of the transmission of practical training, method, and trade-specific experiential learning … Historically, 'designers' were a product of artisans and trades people creating artifacts in response to human need… These artisans often employed apprentices to be trained into the craft by the way of learning through observing, copying, and marking' (Hoh, 2016, pp. 13–14). Thus, the first design educators were artisans, and apprentices were the first design students. Before the Industrial Revolution, design education followed an artisan-apprentice model focusing on transferring skill and fine-quality craftsmanship. The artisan-mentor

exerted complete control over the training, leaving the apprentice without design autonomy. With the entrance of the Industrial Revolution in the late 1700s came modernization and the subsequent replacement of numerous craftsman industries and production processes. Mechanized hands bypassed the artisan-apprentice framework; consequently, artistry and quality of goods were adversely affected. In response, the Arts and Crafts movement emerged, swinging the pendulum back to the conscientious handcraftsmanship of artisan design. The Arts and Crafts movement arose in Britain around 1880 and spread across Europe and North America. Over the next three decades, links were established between education and industry, while "design education still maintained its focus on observation, copying and making and not on the development of creative self-expression" (Hoh, 2016, pp. 13–14).

Between the 1890s and the First World War, the design emerged as a separate discipline distinct from art education with the establishment of the Bauhaus. The German-born institution specialized in craft workshops and meshed "the theoretical curriculum of art with the practice-based approach of arts-and-crafts schools in an attempt to eliminate barriers between the two disciplines" (Hoh, 2016, p. 16). Due to the 1932 Nazi siege in Germany, the Bauhaus underwent a reconfiguration, replacing life drawing courses with design fundamentals courses. The ultimate dissolution of the Bauhaus in 1933 resulted in the global dissemination of the Bauhaus ideology as its instructors and students emigrated (Volkmann & De Cock, 2006).

'After 1945, textile design courses evolved in art colleges, technical colleges and polytechnics, and the trained designers moved into the steadily expanding field of apparel design, fashion and television, as well as corporate design for trade and industry' (Conway, 1987, p. 136). The 1960s witnessed design education 'encouraging experimentation in media and materials, increasing the academic core of art and design education through the study of the history of art and complementary studies' (Hoh, 2016, p. 17). During the mid-to late-20th century, literature on design methodology began to amass with substance. Design as a particular discipline dawned at universities. 'A result of cultural and economic change that stimulated interest in design as a mode of cultural and economic advancement," which in turn sparked "a demand for designers to work in newly developed fields' (Hoh, 2016, p. 17).

With an awareness of how design education has evolved over the past two and a half centuries, from ' an outgrowth of eighteenth and nineteenth century industrialization with a haptic, embodied creative process to a production-driven, media-centric curriculum, it seems that design students have the potential to benefit from a reflective practice' (Borg, 2012, p. 2). With such a contemporary emphasis on concept development, product outcomes and technical skills, little, if any, is devoted to reflecting on and externalizing the tacit knowledge and insights that transpire over the design process. Such a reflective practice could be a component of a foundations course as a way of helping students to have an embodied experience of reflection on action. It would give them a helpful tool to return to later in their professional career (Banno, 2020).

Design education and learning provide theoretical and practical knowledge of the process and final execution. This knowledge is gained through experience. Designers are the practitioners who reflect upon their practice. To be an acclaimed professional, a designer requires hard skills, including drawing and 3D manipulation with different mediums and software. In addition to these skills, a designer should be equipped with reflective skills. In many ways, reflection helps the design students during academics and when they leave the educational system and work in the professional field. Learning by doing is the basic idea of design education, which allows students to reflect during their design process. Design educators work as facilitators during the design who help students' experiential learning through guidance on different steps and critical evaluation and feedback (Bye, 2010). Nevertheless, the interaction between teachers and students is verbal. Students also discussed their learning and progress, which is also based on oral discussion (Laamanen, 2012). There is an opportunity to explore reflective practice in the context of textile design studio practice. The relationship between reflection and the design studio is discussed in detail in the next section.

2.3. Design studio practise and Reflection

Despite empirical research lacking in the art and design literature, some authors have contributed to a collective understanding of best practices in art and design. Sims and Shreeve (2012) identified six signature pedagogies in art and design classrooms. First, the authors explained that learning in the art and design context occurs in a *studio*. The studio serves as both a physical classroom space and an environment where students socialize in the profession. Next, the *brief* is an assignment of a complex problem to be solved and serves as the tool by which an assignment is communicated from the instructor to students. The brief is the fulcrum in which faculty and students centre their dialogue in a cyclical process of giving and receiving feedback and deconstructing and reconstructing assumptions and solutions to the problem at hand. In addition, the *critique* is the formal process in which students receive feedback from instructors, peers, and external practitioner reviewers and are expected to be able to articulate and defend their creative decisions. Students' conceptual process is documented in the *sketchbook*, which instructors use as a reference to understand the evolution of student's work and their thinking for formative and summative feedback. As the authors stated, 'the sketchbook is a form of visual thinking and an important part of the research process that practicing artists and designers undertake before they can produce finished artworks or designs' (p. 63). Still another signature pedagogy in art and design is student research in which 'design students are expected to select source materials, to find out about the *context* of their design, and determine their market or end user. If they are fine artists, they develop questions about living in the world to which they will respond through creative activities' (p. 63). The final signature pedagogy Sims and Shreeve identified is *dialogue and discussion* in the art and design classroom. Given the other signature pedagogies, it is easy to recognize dialogue and discussion as overarching practices because they are woven throughout each teaching and learning method.

For this study, I focused on the *studio* and the *dialogue and discussion* as essential elements of the art and design classroom. The studio is the central space (physical and theoretical) where teaching and learning take place and is viewed comprehensively by students and instructors as the core of a creative education. Further, the dialogue encompasses the discussion between faculty, students, peers, and outside reviewers in teaching and learning; and the commentary on the sketchbook and research students completed throughout the creative process.

Teaching and learning in an art and design curriculum centres on the studio. The growing interest in studio context learning has developed in many fields, including education. Educators have recognized the value of collaborative, reflective, and engaged learning in the studio setting (Boling, Schwier, Gray, Smith, & Campbell, 2016). Cennamo and Brandt (2012) explained that the studio 'is simultaneously a class, a space, and a pedagogical method of instruction' (p. 840). Components of a studio classroom typically include a designated workspace or desk for each student to be kept throughout the term and is often accessible (and utilized) 8 hours a day; an extended class meeting time (usually three times a week for half a day); hands-on individual and group-based assignments in the form of project briefs; and intermittent critiques of student work as a form of pedagogy and assessment (Boling et al., 2013; Cennamo & Brandt, 2012; Klebesadel & Kornetsky, 2009).

The frequency, type mark studio culture, quality of interactions between students and faculty and the sense of community felt by students and instructors. When executed intentionally, student and instructor interactions in a studio can develop into a relationship that establishes a culture of collaboration (Klebesadel & Kornetsky, 2009). In discussion-based studio critiques, faculty encourage students to reflect on their decision-making process and model their design thinking habits to students and facilitate class-wide meta-conversations to make connections between the task at hand and more extensive art and design concepts and further developing community (Cennamo & Brandt, 2012). Through these shared learning experiences, students become socialized into the profession by engaging in the 'habits of the studio' including sharing feedback, working alongside and along with

peers on projects, and learning how to articulate their thoughts using the technical jargon of the field (Cennamo & Brandt, 2012, p. 23).

Sevigny and Dinham have advanced two important models of studio instruction. Sevigny (1989) has proposed a complete model of art studio instruction. This model considered all phases of the teaching, learning and environmental framework that exist in art studios. Tafahomi (2022) has also discussed a model of studio instruction. The model closely parallels this research in that it addresses the desk critique as a central theme of the design studio. One of the most important types of research concerning teaching-learning strategies in studios has been carried out by Schon (1988, 1985). Schon argued convincingly that the backbone of design education is the design studio and that it needs to be clearly understood as a way of teaching and learning. The design process model by Pahl and Beitz (1996), further cited by Almendra (2010), is another commonly discussed type in design studies.

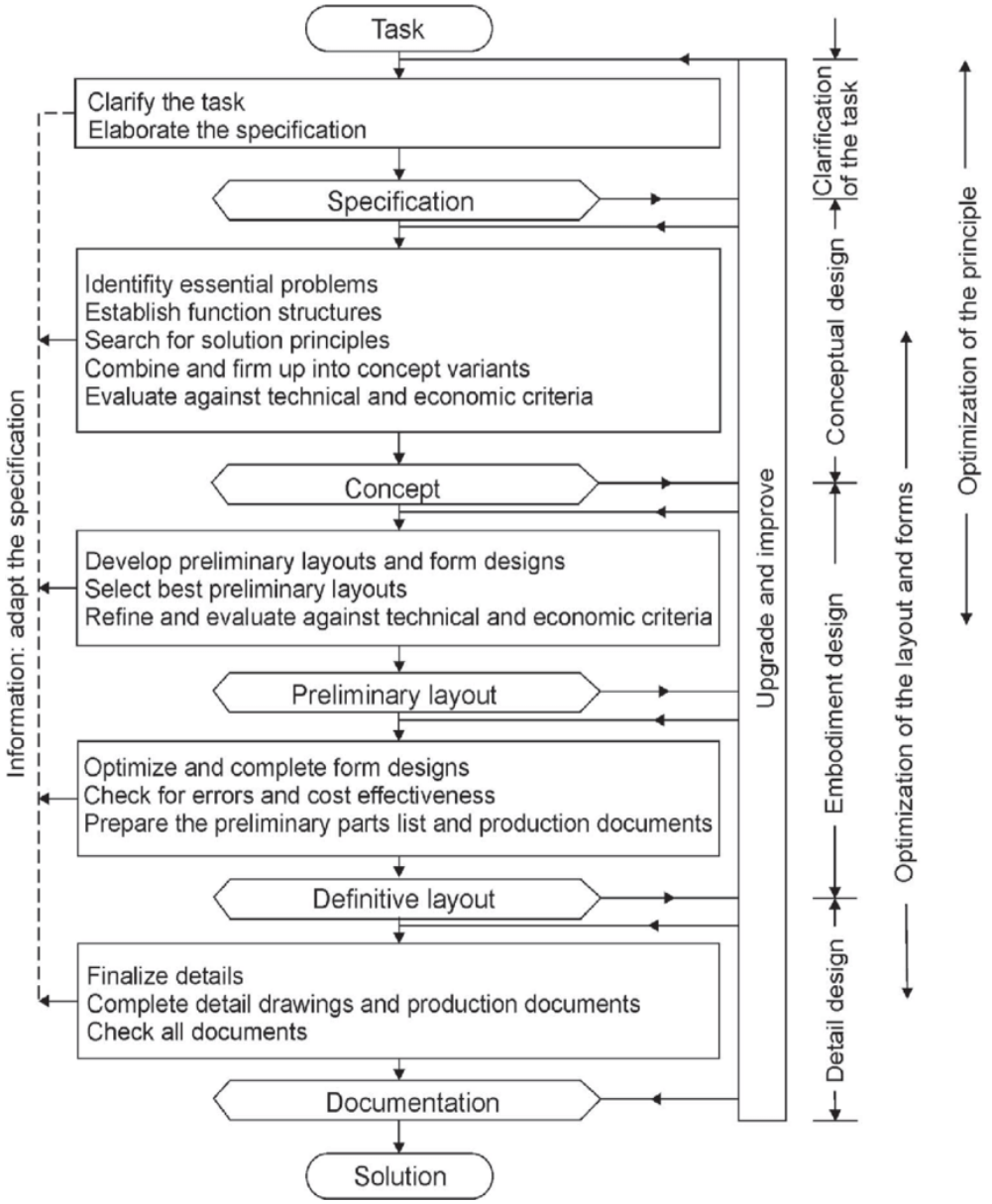

Figure 2: Design process Pahl and Beitz, cited in Almendra (2010)

This model depends on engineering design studies and influences textile design. This design illustrated the design process with a bit more information and naturally showed the various phases of the design

operation. Each phase is displayed as a chain, linked together, and looping iteratively by determining the goals, researching, idea development, concept evaluation, sophistication, and design result. This model explored the design process's various realms by identifying groups that the designers reference while discussing the look and the design process (Almendra, 2010).If we consider any design development model, the typical element is not a linear process (Hwang, 2013). The designers faced contingency or unpredictable situations in the design development process. To proceed in design development, designers should look back and change their minds to make different decisions (Santis, Silva, Giuseppe, Marcicano, Maria, Leandro, & Victor, 2017).

Designers need several strategies and abilities to produce a regular quality textile design (Worbin, 2010). One of the avowed aims of academic education is to prepare graduates for the unpredictable professional landscape of the design process. Educators should develop conceptual skills and design processes to provide students interdisciplinary opportunities. The textile industry now stresses keeping a balanced education that combines practical skills, conceptual thinking, and moving into the learning process (Lynas, Budge, & Beale, 2013). For this purpose, studio practice is a popular method in textile design education. Real-world activities and difficulties are the essential characteristics of design studio learning (Vuletich, 2015). Students are trained to work collaboratively to produce innovative products and artefacts. Design studio teaching draws from constructivist, experiential, and social learning theories (Senbel, 2012). Constructivist and experiential learning theories suggest that students discover through interaction, personal experience, and discovery in the academic environment (Dewey, 1938; Tezel & Casakin, 2010). Design students tend to understand by 'experiencing, reflecting, believing, along with performing in the procedure of finding answers to assigned design issue' (Demirbas & Demirkan, 2007, p.345).

Studios are equally an actual workspace and instruction and a pedagogical teaching technique. Design studios have areas to showcase student work for informal and formal assessment, assign workspaces or desks for students, and foster a collaborative setting between students and the teacher (Cennamo & Brandt, 2012). The teachers in design studios frequently employ private or public critiques of students' work to offer feedback to students, whether of students' sketchbooks, works-in-progress, or maybe the last model of the work (Yassir, 2015). The design teachers can collaborate with team projects and switch the design studio classroom into an educational and creative think tank (Clarke & Cripps, 2012).

Cennamo and Brandt (2012) recommended *five guidelines* for studio educational design dependent on their research. For *starters*, students' tasks must be like one another in the terminology of context and objectives to permit students to learn from one another while allowing variations in students' work. *Next*, students must be supplied with formal and informal critique and collaboration opportunities. *Third*, the instructor must lead formalized open critiques to present students' and teachers' opportunities to model design thinking through dialogue and comparison. *Fourth*, studio teachers must keep meta-disc discussions in reaction to essential choices in students' work and raise class conversation out of details about the student's work on the far more abstract concepts of design applied to many scenarios. *Finally*, instructors must motivate the reiterative dynamics of design and give students opportunities to review and work-in-progress feedback. Iteration and reiteration had been labelled as reflective discussed by Schon (1983). According to Schon (1983), designing is a reflective conversation involving complex processes representing multiple variables, including moves, norms, and relationships. Reflection on the design process brings artistry and intuition to the design process, embraces the process's uncertainty, and relies on the designer's skills to conclude the problem (Challinor, Marín & Tur, 2017).

Louis, Remon, Sylvia, Elise, John, and Engbert (2019) considered Kolb's (1984) idea of reflective observation. Once the students step back from the issue, they evaluate their theories and solutions concerning the layout issue, impartially making changes. Active learning happens once the learner captures the action with procedural knowledge to evaluate their proposed resolution to the design

problem (Coorey, 2016). Design studios are usually cooperative learning environments that allow students to collaborate in a less individualistic and competitive setting, encouraging active learning and reciprocal interaction (MyungHee, & Dong-Eun, 2016). Fayombo (2012) supported this idea of active learning and elaborated that students are subjected to numerous perspectives and personal experiences in a studio atmosphere, broadening students' knowledge base. Sharing of understanding and knowledge amongst students in a world like a design studio allows for a job's successful and significant accomplishment, leading to skilled designers (Pellegrino, Baxter, & Glaser, 1999: Hwang, 2013). It is also found that the more innovative students focused on their project and spent time discussing and critiquing classmates' work through peer assessment (Karpova, Marcketti, & Barker, 2011; Hasirci & Demirkan, 2007).

Reflection relates to conversations about personal experiences. Reflective practitioners attempt to explain the knowledge and understating through individual or collective discourse and reflection. Various conversational spaces include (but are not limited to) textual, technological, private, public and even imaginary. Discussion and conversation through digital video recordings are proposed for the present study because it relies upon reflections for stimulating double-loop learning experiences. One of the primary advantages of video conversations is that they are "available for repeated revisiting and reflection" (Baker, Jensen & Kolb, 2002, p.8). The study of reflective practice is a significant field within education because of its significance to development, lifelong learning, growth, and success. As technology has continued to advance, digital or e-learning experiences have become more popular due to their ability to transcend time and space, reduce the cost of professional development, and provide more flexible options for reflection in action and reflection on action. The relationship between reflective practice and creativity supports a need for further research in textile studio design to ensure the development of quality and innovative workplace e-learning experiences. The study of quality and innovation in workplace e-learning presents an opportunity to understand better how instructional design factors are related to creative instructional design.

2.4. Mobile Technology and Education

Technology is present in all learning environments for students today and changed the classroom environment. It has an impact on student motivation, engagement, and achievement. Barriers exist to effective implementation, and diverse goals stand in the way. Research has revealed that technology has increased student achievement and positively impacted the classroom environment (Harper & Milman, 2016). Students use technology programs or the internet to access multiple resources daily, gaining knowledge quicker and easier. Before technology, much time would be spent in the library looking up research and writing down information collected. Programs now provide better ways for students to connect with their peers and teachers, increasing daily interactions (Swallow & Olofson, 2017). These programs are beneficial because they create discussions, provide feedback, and connect people remotely. Students can also demonstrate their thinking skills and work at their own pace, all characteristics that support success.

Mobile devices are the prevailing tools for technology adoption in education, also discussed by Nikolopoulou, Saltas and Tsiantos (2023). Different learning styles are accommodated with mobile devices. The mobile technology used today can read to you, students can receive feedback in multiple ways on various projects, and visuals become a way of communicating content learned. Given the number of choices, students are more likely to be engaged and motivated. This differentiation means that students have a variety of ways to demonstrate what they know. Technology is beneficial to help decrease the academic gaps of many diverse students because each student has their device allows teachers to differentiate. Students can be given a text at their reading level, which can differ from others. Extra materials and resources can also be provided to ensure understanding new content at their instructional levels. More significant gains were also seen in students who could work independently (Urbina & Polly, 2017). Mobile phone technology creates productive learning

environments that better meet the needs of all students. Providing more opportunities for teachers to differentiate means that all students are provided with what they need to learn the material and feel successful (Ahmad, 2020).

Since the introduction of mobile devices, students now have more information at their fingertips and can look up unknowns in real-time, so the learning continues. Teachers can assign work that would otherwise seem insurmountable. It expands the scope of learning because it helps students move beyond the classroom walls providing different learning experiences. Students can now take virtual field trips to places worldwide and connect with students on the other side. Opportunities such as these are endless. Technology also joins students online to discuss projects increasing student collaboration. It was reported that because students use the devices inside and outside the classroom, overall performance and motivation have increased (Harper & Milman, 2016). Because students are more motivated to succeed and interact in the classroom carrying this trait out in the real world is what education programs are ultimately trying to achieve. They are not only preparing them for future job opportunities, but they are also becoming lifelong learners (Lestari & Indrasari,2019).

Technology provides valuable feedback to happen in several different ways for the teacher and the student. Feedback from the teacher to the student allows students to stay on the right track throughout an assignment or project. It also informs the teacher which students may need more support. Some available programs or apps provide ways for meaningful real-time feedback. For example, the teacher and student can share a project online through technology, and feedback is electronic. Effective real-time feedback is beneficial for scaffolding students to reach their goals successfully. Technology allows multiple students to work on the same project or share an app with the teacher to communicate collectively without disrupting the class. Feedback from the student to the teacher through participation and informal and formal assessments provide data that benefits further teacher instruction and can be correlated directly to student performance. Student motivation, engagement and achievement are three categories that are referenced in almost any research being done when it comes to classrooms. Research has consistently shown that technology positively impacts student motivation, engagement, and achievement. When student motivation is high and engagement in lessons increases, student performance increases, leading to better student achievement (Kimmons & Rosenberg, 2022).

The use of mobile devices initiative has changed how students view learning. Due to their own devices, students can now interact with a wide range of other learning activities instead of learning only from teacher lectures and worksheets. Students turn in assignments electronically, receive feedback in multiple ways and gain a deeper understanding of topics they are interested in through ongoing research. Using technology, students can ask more questions they did not feel comfortable asking in front of peers. Research indicates that electronic devices improve communication between teachers and students (Lestari & Indrasari, 2019). Mobile devices allow this connection to increase student engagement. With motivation and engagement, students are more likely to raise achievement levels. Technology has increased the overall learning experience of students. Research indicates that interaction through cell phones positively impacts student achievement (Harper & Milman, 2016).

Though many educators realized early on how technology in the classroom helped teach and learn, further modifications had to occur. Even though progress has been made with technology in education and the availability of instructional tools, widespread technology integration has yet to result. Some of the biggest challenges still occur in the complex relationship between technology and the people who must adapt and use technology (Eksail & Afari, 2020). The realization became that teachers having specific knowledge and skills alone is not enough. Still, an individual's attitude and beliefs were recognized as important factors affecting the use of technology (Elangovan, Guydeuk, Perumbilly, & Awungshi, 2021). Further, although technology in the classroom can increase engagement among teachers and students, concerns still exist that may hinder the adoption of technology integration. For example, even when teachers support educational technology for teaching and learning, the

administration's backing is crucial to success. Concerns about staffing or the cost of technology may affect administrative support. Another challenge of technology integration is students need to show interest in the way of learning that is non-traditional. (Kimmons & Rosenberg, 2022).

Classroom technology is constantly changing, and teachers directly link technology and students. A common theme in the research is that teachers need more support for technology (Heinrich, Darling-Aduana, Annalee, 2020). Teachers should be adequately trained, and professional development opportunities are limited, yet teachers are expected to use technology to develop 21st-century learners. Teachers can buy into new technology programs districts want to implement with support. Teachers need ongoing opportunities for technology integration, so the purpose of the technology is understood and implemented effectively with lesson plans. Researchers have found positive uses for phones in the academic environment. The inappropriate use of mobile phones in the classroom has presented significant barriers to successfully implementing the technology in the classroom. Kuznekoff and Titsworth (2017) conducted a study that assessed the impact of mobile phone distraction on student learning after watching a video lecture.

Technology adoption for various purposes and usage has been in fashion for the last two decades, particularly after the popularity of smartphones. Besides the evident benefit of technology in daily life and the education sector, there are certain challenges associated with technology in teaching and learning. One of the challenges of using technology in education is the varying levels of access and ownership of devices among students. Studies have shown that, with a significant percentage of individuals owning smartphones and using them for various purposes, including education (Poçan, Altay, & Yaşaroğlu, 2023). However, there are still some disparities in mobile device access and use across different socioeconomic groups and regions. A challenge is the issue of distraction, as mobile devices can be a source of interruption and lead to a lack of focus during learning activities (Criollo-C, Guerrero-Arias, Jaramillo-Alcázar, & Luján-Mora, 2021). Diversified data is available on the internet, and it often becomes difficult for the user to focus on one specific point. The idea of "technological distraction" or "digital distraction" is a widely discussed concept in technology and its impact on human behaviour. One influential researcher in this area is Dr Larry D. Rosen, a psychologist and author known for his work on the effects of technology on human behaviour, including attention and focus. In his book "iDisorder: Understanding Our Obsession with Technology and Overcoming Its Hold on Us", Rosen (2012) explored the concept of digital distraction and its effects on various aspects of life, including education.

Accessibility and equity are other challenges associated with technology use in different social and economic classes. Technology has a cost, and only some individuals or groups can afford it. This challenge exacerbates in Pakistani society as government support for quality education is limited, and there are different education systems with different fee structures and facilities. Ifeanyi, and Chukwuere (2018) pointed out that technology has the potential to widen the digital divide between students who have access to technology and those who do not. In addition, there are also concerns about the cost of technology and whether schools and students have the necessary resources to support its use. Zhang and Yu (2022) discussed the impact of teacher training and attitude towards technology adoption and effective usage. Many teachers need more skills and knowledge to effectively integrate technology into their teaching practice, which can lead to a lack of confidence and competence when using technology in the classroom. Continuous teacher training on the changing technologies is essential for effectively using technology in the classroom and other educational practices. In a study by Domingo, Gargallo, and Contreras (2017), teachers reported needing more guidance and training to implement video-based reflective practice in their classrooms.

Asif Va, and Panakaje (2022) found that technology integration requires a paradigm shift in teaching practices, and this can be achieved through professional development programs that focus on technology integration. Before that, institutions should have access to appropriate technology and resources to ensure that all students have equal opportunities for learning. For this purpose,

universities and colleges should invest in the latest technology and software. Tamhankar, Pujari, and Patil (2019) discussed the distraction produced by students by using mobile technology. Educators should develop strategies for active and interactive learning by using mobile phones. This cannot be possible without assistance from information technology and computer-related experts. In collaboration with educators, the IT industry should develop interactive apps that promote collaboration and participation that can help keep students focused on learning. For online safety, privacy, and ethical issues, Ribble, Bailey, and Ross, (2017) emphasized the importance of developing digital citizenship skills in students, including understanding digital footprints, responsible social media use, and online etiquette.

Besides the limitation of technology, I observed a lot of potential for its use in different stages of education. This study showed the multi-dimensional impact that mobile phones can have on student learning, resulting in significant pedagogical and theoretical implications. The present study focused on using mobile phones for recording purposes. The key objective of the recordings was students' reflection on their textile studio design practice. Section 2.5 discussed the use of mobile phone recordings for reflective purposes. This phenomenon is discussed as digital reflective practice. (DRP).

2.5. Digital Video Reflective Practice

Researchers (e.g., Carole & Jonathan, 2013; Benade, 2015) considered that the technological developments of the 21st century require new paradigms for rhetorical analysis and critical literacy. Among these new paradigms, we must also recognise that digital technologies allow for an unprecedented mode of disseminating texts. Our students must make rhetorical use of modal affordance in our professional and personal communications articulately and with critical awareness. Reflective journals, teaching portfolios, learning communities, and mentoring have all been practical tools to promote reflection. As emerging technologies are embedded in reflection, investigating their implementation, benefits, and drawbacks is necessary (Mariah & Anette, 2019). Brailas, Koskinas, and Alexias (2016) examined weblogs as a web-based journaling tool to encourage reflective practice among preservice teachers. They found that when using the journaling weblog program blogger, the reflective practice was promoted as the user interface and structure of Blogger™ provided an innovative and user-friendly experience for participants in this study. Weblogs have great potential as a unique mechanism that can enhance the development of student reflectivity (Sullivan & Longnecker, 2014). Beth and Crouch (2008) implemented a weblog action research project to use technology to teach teachers about multicultural education topics and issues in a related study. In addition to promoting dialogue and discussion beyond the limitations of a physical classroom, blogging allowed teachers to learn about and use a new technology form (Beth & Crouch, 2008).

Campbell and Tran (2021) noted that the literature on this topic is growing. Thus, a study is conducted to illuminate the learning benefits of preservice teachers constructing and sharing digital stories. Using qualitative methods, explored the connections between digital storytelling and e-portfolios to assess preservice teachers that incorporated their digital story as an integral part of their e-portfolio. In addition to the digital stories becoming an object of reflection, the stories helped the preservice teachers present their learning innovatively, enhancing synthesis and analysis of their learning experience related to their portfolio artefacts (Campbell &Tran, 2021). Digital storytelling technology can support new opportunities for curriculum and instruction by allowing learners to initiate reflective processes innovatively by facilitating preservice teachers' ability to record their thinking and assess their progress (Daniel, 2017).

In recent years, e-portfolios have gained popularity in eliciting evidence of student learning and thinking processes in project-based work. The claim that e-portfolios provide opportunities to highlight both the process and the product makes e-portfolio implementation appealing to instructors, researchers, assessment designers, and designers of e-portfolio systems. Also, college admissions

have started considering '*maker portfolios*' to admit students into their programs and 'communicating effectively with visual evidence' is a must, particularly in the context of making where 'fabricated objects are multidimensional and require multiple modes to convey all the elements of a project' (Campbell &Tran, 2021). In the context of e-portfolios, Peter and Michaela (2018) stressed the importance of e-portfolios as spaces for learning and reflection, as they serve a 'learning and reflecting' purpose by providing observable opportunities for students to reflect on intermediate steps and, at the same time, e-portfolios also perform a 'showcasing and accountability' by providing visual evidence for facilitators to assess student's learning using stories or narratives the students share and artefacts that the students showcase.

However, Bryant and Chittum (2013) highlighted the areas for improvement in e-portfolio research, investigating the landscape of e-portfolio research to determine what evidence existed for e-portfolios' impact on student outcomes. They claim that out of 118 peer-reviewed journal articles they reviewed for their study, only 15% 'present original data, qualitative or quantitative, on student outcomes' (p. 193). The remaining e-portfolio research they reviewed was descriptive (42%), often citing learning theory without original data, or technological (9%), emphasizing the structure and usability of e-portfolio platforms, or providing a description of a forum, or affective (34%) focusing on attitudes and perceptions of the instructors and students. This situation suggested that research on e-portfolios has under-explored how students use and populate the portfolios and how that contributes to their learning.

Incorporation of any technology into teaching and reflective practice requires teacher educators to evaluate its potential benefits and drawbacks and the receptivity of the participants or learners to the technology (Kimmons and Rosenberg, 2022). There are multiple methods to use digital technology for reflection, such as online diaries, digital notebooks, reflective blogging, audio recordings, video journaling, and social networking (Benade, 2015; Kirk & Pitches, 2013). McNally (2021) conducted a qualitative study using video-enhanced reflective practice (VERP) to improve school-based mentoring. According to the study, VERP helped improve mentor-mentee relationship quality. Additionally, video reflection enhanced the teacher's confidence and improved reflexibility during the mentoring process. They also suggested that 'the skills developed through VERP transferred to their other mentoring relationships and beyond' (McNally,2021, p.54).

Kasey (2018) also concluded in a case study of veteran teachers that video-reflective practice affects instructional delivery. Using video reflection in teaching also facilitates student engagement and behaviour that encourages student achievement (Kasey, 2018). Daniel (2017) explored the use of Video self-confrontation in music instruction. Daniel (2017) discussed the recording of 'practice sessions to address possible gaps between their perception and the reality of their practice habits' (p,67). Video confrontation affects practice skills and enables students to be self-monitored in various phases of their creation. Students can identify their problems while reviewing their recordings and fix them for other outcomes. Daniel (2017) recommended that the practice of video reflection should be integrated with the curriculum on different levels of music instruction and related disciplines.

Mcvee, Shanahan, Hayden, Boyd, Pearson and Reichenberg (2017) concluded that a video self-reflection is a valuable tool for teachers to develop their core beliefs. Watching the video gave the teachers evidence of changes that needed to be made and the time to self-reflect on how to make those changes best. When teachers made these changes, they noticed that students became more engaged in their classes. As the students showed learning and engagement, the teachers became more confident. During studies, five expert teachers provided insight into the qualities of good dance teachers. These qualities were communication, attention to detail, the ability to adapt lessons according to student needs, persistence, and a willingness to be a lifelong learner. The study's results demonstrated that video self-reflection was helpful for dance teachers to become better dance educators.

Sullivan (2021) studied engineering students and explored 'does Intentional Reflection Promote Learner Creativity and Innovation?' (p.1). Sullivan (2021) suggested that if an educational course is intentionally planned with careful reflection showing techniques, it will enhance the creativity and innovation of the students. There might be few risks in student-teacher relations in this way of setting. However, it will take on new characteristics and become a unique experience for all in the learning environment. Shelia (2014) also recommended video production as an essential pedagogical tool for 21st-century learners, enhancing students' engagement and interactivity. Similarly, Bernabeo and Michaelides (2017) also discussed video as a tool to enhance teacher reflection, enabling them to retain a reliable memory of their teaching. Teacher reflection is based on what teachers believe has happened, and the videotape provides the indisputable evidence needed to build trust in the growth process. Reflective teaching can effectively increase teacher efficacy and student achievement (Dawn, Hinkhouse, & Leah, 2010). Sari, Dardjito and Azizah (2020) analysed reflective video activities with a professional learning network in mathematics classrooms. The results suggested that the video captures were effective in prompting reflective conversations. These conversations were analysed through the proposed framework, which proved to be a well-rounded viable approach for analysing video-based reflective discourse.

Dennis (2007) and Doughty, Francksen, Huxley, and Leach (2008) discussed the importance and application of multimedia tools in performing arts education. According to them, an affirmative relationship exists between learning, creativity, and interactive means of reflection. Carole and Jonathan initiated the digitalis project (2013) and discussed the digital video-based reflective practice in visual and performing arts. The findings of their 'Digitalis project' presented some technical challenges for artists and designers. However, overall benefits were seen in the creative process of various art and design disciplines. A similar kind of project was executed at Montfort University's centre for excellence, which resulted in the positive outcome of digital reflection in choreography education (Doughty et al., 2008). Imperial College and University College London have also curated a joint digital art exhibition, an example of using digital tools in art curation, integration, and display (Fredericksen & Grindle, 2010).

Previous literature supported the idea of reflection in art and design studio practice. It is also seen that artists and designers agreed to express their ideas and thoughts in writing. Artists and designers acknowledged the importance of RP, but practically only a few examples are seen in this area. Only some artists use written reflection to express their thoughts. Generally, artists and designers tend to explain their idea verbally but feel reluctant when asked to transfer their taught in reflective writing (Yee, 2007; Lousberg, Rooij, Jansen, Dooren, Heintz, & Zaag, 2020). This attitude provides an opportunity to use other mediums of reflection for artists and designers other than conventional writing and journaling. Digital tools, particularly visuals & videography, help artists and designers in reflection (Challinor, Marín, & Tur, 2017).

As digital audio and video recordings are a comparatively new phenomenon to reflective journals, reflective practice might face challenges. Some students and teachers may view the video camera as a threat, an imposition in their classroom, or an evaluative tool that keeps a lasting record and cannot be modified. Supervisors, cooperating teachers, and video study group facilitators and peers can take action to assuage some of the student teachers' anxieties and draw their focus away from elements such as their physical appearance or embarrassing speech or gestural habits and towards student learning and instructional methods. In a phenomenological study of how student teachers experienced video analysis of their teaching, Greenwalt (2008) found that some students felt decomposed by the analysis. 'Participants felt their selves being broken into pieces as if in a Cubist painting' (p. 392). Students also expressed a desire for the video to represent their teaching and a fear of alienation due to the camera's power. Despite these experiences, students did experience a more

significant notice of classroom events. If the camera is seen as an imposition, thinking about the spaces in which students can respond to this imposition should be an ongoing focus for teachers and teacher educators. (Fadde & Sullivan, 2013; Greenwalt, 2008; Hamidah & Yusuf, 2019; Tripp & Rich, 2012). Van Es, Tunney, Goldsmith, and Seago (2014) further explain that 'Teachers need support to learn how to use video as a tool for their learning - to not only see what is worthwhile but also how to dissect the details of the interactions represented in this video and use them as evidence to draw informed interpretations of teaching and learning' (p. 13).

Overall, video-based tools offered participants in their study the ability to play both actor and critic while allowing them to repeatedly look at teaching and learning (Körkkö, Morales, & Kyrö-Ämmälä, 2019). Wright (2008) also compared non-video-based reflective practice with video- enhanced self-reflection and developed a more effective, encouraging reflection process. Coffey (2014) used a qualitative approach that revealed self-reflection through a video-based process positively impacted teachers' reflective abilities to gain a better understanding. Video facilitates teacher reflection because it can provide multiple perspectives that aid teachers more effectively as they identify areas for improvement (Trent & Gurvitch, 2015).

McConnell, Lundeberg, Koehler, Urban-Lurain, Zhang, Mikeska, Parker, Zhang and Eberhardt (2008) compared the differences between written and video-based reflective practices. McConnell et al. (2008) found teachers who use video to reflect a higher probability of reflecting on evidence-based facts about classroom situations. Teachers who use written reflection alone only have their memory to base their findings on and tend to be influenced by their interpretations and opinions. Teachers who viewed their teaching practice recordings noticed previously unnoticed events. It was also suggested that reflecting using memory alone may cause teachers to suppress events that cause negative emotions and avoid events or habits that need attention (Samrajya, 2014). For the presented work, the lens of digital reflection was narrowed to focus on digital video and audio. Digital videos are used for reflective practice, and their effect on creativity was analysed by taking opinions from teachers, students, and Heads of departments.

2.6. Creativity and Studio Practice

For many years, theorists (Sternberg & Lubart, 1995; Amabile, 1996; Csikszentmihalyi, 1997; Sternberg & Lubart, 1999; Cropley & Cropley, 2009; Sawyer, 2017; Runco & Jaeger, 2012; Tsai, 2012) have been trying to explain creativity but find it challenging because of the complex structure of creativity (Mullet, Willerson, Lamb, & Kettler, 2016). The variety of explanations of creativity is related to researchers' investigations, questions, and study results. Many base explanations share a theoretical consensus around concepts, attributes, characteristics, and themes. For example, Sternberg and Lubart (1999) defined creativity as 'the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful concerning tasks constraints)' (p.3), which is comparable to Runco and Jaeger's (2012) explanation that creativity is a unique characteristic that reflects an individual ability to adapt or change circumstances that affect the cognitive abilities to integrate or evolve ideas. On the other hand, Gitomer (1989), as cited by Kaufman & Beghetto (2009), indicated creativity as a desired quality for admissions to graduate school' (p.1).

Cropley and Cropley (2009) looked at creativity as a learning aspect that individuals can be taught through motivational, emotional, and intellectual approaches, while Guilford (1950) sees it as a measurable construct. Piirto (2010) implies that 'Creativity is in the personality, the process, and the product within a domain in interaction with genetic influences and with optimal environmental influences of home, school, community and culture' (p. 392). All the previous explanations conceptualize various levels of creativity, which is the concept that suits the idea of investigating creativity in a classroom.

In design education, lectures and studio classes are two approaches to teaching students. Design studio classes offer an ideal educational setting for students learning. Duzenli, Alpak, Cigdem, and Tarakci (2018) stated that in studio classes, students are engaged in several activities where the acquired knowledge and skills are integrated and applied. Studio classes offer students opportunities to gain understanding, develop skills, and enhance their creative ideas. Several teaching methods and practices could be applied in design studios to enhance students' learning and creativity. Students develop many skills and gain advantages of interaction with their instructors and classmates and involvement of direct visual, verbal, tactile, written, and communication potential. The exchange in the design studio environment could provide more learning experiences to students than in non-studio classes. Higher education teachers need to consider the critical role of creativity in teaching and preparing students for the complex world that will require their creative abilities. Therefore, teachers are advised to promote creative thinking through strategies, methods, exercises, and instruction that address and develop students' creative skills (Duzenli, Alpak, Cigdem, & Tarakci, 2018).

Creativity is one input of an innovative artefact. Researchers have described it as an intricate product or service of numerous interacting pieces, including intelligence, creative power, design, character, inspiration, expertise, and environment (Batey & Furnham, 2006; Bye, 2010). Individual qualities, creative abilities, and cultural atmosphere can influence creativity in a program and an individual or artefact (Abdollah & Hossein, 2018). Hasirci and Demirkan (2007) considered that students' creativity and process performance in a design studio had been linked. Creative students were more apt to work well in process-related tasks and very likely to interact with the other students. Creativity research draws from education-psychology research into individual cognition, while collaboration research draws from socio-cultural research into group processes (Hämäläinen & Vähäsantanen, 2011; Hasirci & Demirkan, 2007; Sawyer, 2006).

Csikszentmihalyi (2001) argued that creativity is the construction associated with a new and valued action, idea, or object that depends upon temporal and cultural context. Based on Good and Mishra (2016), the term 'creativity' is often used in the environment, process, product, or individual. Batey and Furnham (2006) suggested that creative work comprises four below-mentioned interacting components.

- Attributes of the item itself are novel and comfortable concerning a specific socio-cultural group.
- Attributes of the persons who generated the product.
- Attributes of the persons assessing the creativity of the product or output
- Attributes of the environment (For creators and assessors), including the following: source of evaluation, source of support or resources, and source of stimulation or inspiration (p. 359)

Creativity is usually considered the driving force behind the textile and apparel business. The necessity for novelty and variety manifests in apparel, aesthetic demands, fashion, and textile trends (Gurcum, 2017). This study, looking at creativity and design especially informed how reflective practice influences the design process. For this study, when the design students were given sources of inspiration, the creative process of perception and the storage of new visual information occurred in their working memories. The process of encoding this information into their long-term memories began.

Furthermore, new ideas were formed, and the creative processes of designing happened; through sketching, sharing ideas, and revisiting the source of information for more detail for as long as they needed to come up with a satisfactory solution. In addition, while the designers were using this new information, they were also reflecting on their creative process. New ideas rely on stored

information for their creation, and the memory of the human experience is fundamental to a visual artist (Treadaway, 2007).

Various components and creativity may be impacted by the design studio environment, like instruction, specialized skills, social restrictions, and inborn inventive or divergent thinking abilities (Cennamo, 2016). The continual reinterpretation of views is essential to the design process. It is a means to show the designer's suggestions in progress, supply a visual platform for analysis, and showcase places that must be reworked (Elizabeth, 2010). Schon (1983) researched reinterpretation, which happens when designers participate in the design operation. He wrote about approximately interactive processes when designers create 'seeing and moving' (p.139). The seeing pertains to the notion of the inspiring, moving source and then using the pencil's action written while creating many sketches. Schon speculates that the designer 'sees' the sketches, looks for patterns and relationships among shapes and repeatedly refines the sketches until a satisfactory solution is found (Schon, 1983). For the present research, digital mediums and other examples of digital visualizations are rich and dense data of external representations of the designers' thought processes and idea generation while they create.

It is shown from the previous literature that Schon's (1983) idea of reflection enhanced creativity in the textile design studio environment (Banno, 2020). The studio format of education is favourable for many reflection techniques, both from the students' and teachers' sides. But most of the reflection is based on verbal discussion. Documentation through different mediums and understanding these terms and concepts is critical to the different reflection perspectives. A review of the literature for this study supports the idea that creativity is a significant construct to consider within the context of textile studio design. Because creativity is a source of innovation, a component of textile design practice, it is related to the aesthetic representation of an idea. It is an explicit focus in most other design professions. The digital video reflective practice is a conceptual model that suggests how a clear focus on creativity within the studio design process may improve design outcomes. The model has yet to be studied, and more research is needed regarding the role of creativity in digital reflective practice.

2.7. Knowledge and Skills Required for Textile Studio Design

Design educators always seek the knowledge and skills required for students to compete in practical life. Generally, it includes creative thinking and processing, the cognitive spiral, analysis of design process conceptual frameworks, and the development of personal design philosophy (Omwami, Lahti & Seitamaa-hakkarainen, 2020). Design discipline such as textile design combines aesthetics and functionality, so knowledge required in textile design pedagogy always remains a concern for designers and educators (Valentine, Ballie, Bletcher, Robertson, & Stevenson, 2017).

Design studio academic programs often have four primary goals to impart to students: design literacy and knowledge of design metrics, spatial awareness, procedural knowledge, and phenomenological awareness. These four goals aim to instruct students' design process by not merely teaching students the essential understanding of design. Additionally, think about how the artefact is created, how one can produce a workflow, how to handle resources and time, and how to think about the real-world consequence of the physical item or artefact teaching (Senbel, 2012). Textile Design is the combination of two sets of skills that could be related to Ryle's (1949) distinction between 'knowing how' and 'knowing that', that is, between the human capacity to find out truths or organize and exploit them and that of knowing certain truths or facts (Arasinah, Bakar, Ramlah, Soaib & Norhaily, 2014; Ryle, 1949).

Design education deals with theoretical and practical knowledge. Textile thinking refers to the actions and mindset of textile designers. Besides its significance, Combined thinking and making processes in

textile (and fashion) design are rarely well documented (Earley, Vuletich, Goldsworthy, Politowicz, & Ribul, 2016). The design experience is enhanced when individuals transform declarative awareness into procedural awareness when fixing an issue or a job. Procedural awareness is' knowing exactly how,' or maybe taking action, whereas conceptual/declarative understanding is' knowing that,' or even reflection and memorization (Niekerk, Ankiewizc & Swardt, 2010).

To identify skills needed for the textile design practice, reviewing the designers' responsibilities in detail is necessary. The textile design practice requires various skills and abilities that enable designers to interpret textile trends. Designers' duties may vary greatly depending on the task. They may only design and supervise the assignment in some situations. In other cases, they may be involved in every aspect of production, from creating the original design to overseeing the final alterations of the finished product. Knowledge of various printing and construction techniques is required to understand the production process, enabling the designer to create an appealing product that is suitable and affordable to a targeted population (Kamis, Bakar, & Norhaily, 2014). In addition to construction techniques, the designer must be knowledgeable about fabrics and trimmings and be familiar with the drawing, colourways, draping, sewing, costing, and the production process to supervise the details of completing each product. Production of a product undergoes a series of steps. First, the designer communicates their ideas by drawing a sketch. The designer's sketching skills and artistic abilities enable visual communication of the design's proportions, motives, and details. Many rough sketches are drawn to show the details of a new design and worked until a series of drawings/collections is completed. These final designs are then approved by the teacher, head designer, manufacturer, or company owner (Keiser & Gamer, 2018).

For products related to body fashion, both flat pattern and draping are techniques employed by designers in creating the product. Draping is a three-dimensional process of pattern making, a fundamental skill that enables textile designers to translate their design into a finished product. This technique allows textile designers to visualize fabric performance and translate design concepts into a commercial dress form. On the other hand, flat patten making involves accurate manipulation of measurements and angles to create a pattern for clothing construction. Then, patterns are examined for their fit by making first samples, fitting on a fit model, and checking carefully by the designer for any alterations or changes in design. Often merchandisers or salespeople will have a chance to view and comment on the designer's samples made from the desired materials. If the sample product is approved, it will become part of the manufacturer's line and be shown to buyers (Keiser & Gamer, 2018).

The industry has changed profoundly during the last 30 years because of the increasing computer use. Many apparel firms are seeking faster and more efficient methods of product development. Computer technology can reduce the time required and increase the accuracy of many processes. Computer systems are now available to serve the needs of both small and large apparel firms. Computer-aided design (CAD) is the application of computer technology to develop a product up to the point of production. CAD systems for design, colourways, pattern making, grading, and marker making have been available for many years. CAD systems offer significant benefits in time reduction, improved quality, and cost control through the computerization of pattern making, pattern grading, marker making, and plotting. This powerful tool will continue to change how apparel is designed and manufactured. In design, the computer is a tool that speeds up the information-gathering process, sketches and images of products, makes patterns, grades them efficiently, and streamlines the manufacturing process (Kamis, Bakar, & Norhaily, 2014).

The future of textile design and manufacturing is inevitably linked to the increasing use of computer systems and unending progress and change. Therefore, today's designers must obtain sufficient and updated computer skills (Indrie, Díaz, & Kazlacheva, 2019). Hines, Swinker, and Frey (2013) noted the

importance of computer experience for incoming students in merchandising and design. They focus on Web navigation and electronic search strategies. Study findings validate the importance of incorporating Web and electronic modes into the textile curriculum. Additionally, Tabraz (2017) noted the importance of computer experience and its relevance and necessity in the entry- level design position. Specifically, the researchers note Adobe Photoshop requirements in many advertisements for design jobs.

In addition to the technical skills involved in the production, the designer must understand supporting concepts of design, production, quality, art, and colour. As with any career, support knowledge gives employees a broad perspective and the flexibility needed to succeed (Savolainen, Leppisaari, & Niinimäki, 2018). Savolainen, Leppisaari, and Niinimäki (2018) pointed out that designers need to ensure that products can be produced efficiently and cost-effectively by understanding the manufacturing side of the industry. Designers must understand the technical limits of the production system, costing/markup system, fabric properties and care, and marketing and promotion involved in the production process. For example, in a factory with limited sewing equipment for delicate fabrics, the designer's selection of appropriate fabric for the equipment is essential. Designers should recognize potential problems when constructing the sample in the design room. The designer should also test how each new fabric reacts to pressing, washing, or dry cleaning. Therefore, care properties knowledge is critical to producing cost-effective products (Savolainen, Leppisaari, & Niinimäki, 2018).

When working with salespeople and retail buyers, good communication skills are essential in sales. Designers should work comfortably with people to communicate through a complex industry network of buyers, salespeople, design room staff, management, production staff, and publicity teams. Interpersonal skills are critical because designers are often members of a design team. They usually conduct sales meetings to explain the styling of a line and the specific fabric information they need to sell the merchandise to buyers. Educators constantly develop and revise their course content to incorporate projects with such purpose (Valentine, Ballie, Bletcher, Robertson & Stevenson, 2017). Interpersonal skills are also critical when an employee is a team member, such as a design team responsible for developing a category of products or a quality analysis team responsible for testing and analyzing new fabrics (Keiser & Gamer, 2018).

The present literature discussed the skills textile designers require parallel to aesthetics, creativity and innovation. Required skills can be segregated into technical skills, production knowledge of design, and interpersonal skills, including communication and team building. In discussion and result, the current study discussed the views of different cases about DRP and its effective use in textile design studio practice. The knowledge and skills required by the textile designer are discussed in this section to gain the foundation of this research objective. The themes from participants' feedback can be addressed considering the abovementioned skills.

Summary of the Chapter

Digital reflective practice is becoming popular with rapid changes in technology in education and learning. Reflective practice models and methods must continue to improve to ensure digital learning experiences. Creativity is essential in design fields because it relates to an idea's aesthetic representation and innovation. Still, although it has been studied extensively in other design fields, it has yet to be studied extensively in Pakistani textile design education. The following chapter included how this study on creativity in the instructional design of workplace digital learning was carried out. From the studies reviewed above, several key elements emerge as necessary to effectively use audio and video recordings to elicit reflection in support of the improved professional practice. These include reflection as a meaning-making process that involves building knowledge and understanding based on previous experiences and ideas; reflection is a systematic way of thinking based on inquiry; reflection

is most effective through collaboration and interaction with others; reflection requires valuing professional growth of self and others. There are several crucial elements to consider when developing a system involving digital audio and video as a reflective tool. For participants to effectively make meaning from the process, the type of reflection task used to view the video is critical to the effectiveness of the reflections noted by participants (Tripp & Rich, 2012).

In sum, digital reflection is full of possibilities for supplementing and enriching creativity in studio teaching, promoting integrated skills development, addressing socio-cultural themes, and motivating textile design students. Video is one of many technologies that may be used as a reflection tool. There are other possibilities for using digital video technology in the design studio. A literature review supports the benefits of digital reflection at various stages of the design process in textile design. Reflective practice is essential for the personal and professional growth of textile designers. Emotional responsiveness is a component of reflective practice, and tools such as digital video and audio have the potential to in the development of reflection. How-ever, these tools have not been systematically implemented and investigated in the textile designer development literature.

Consequently, more is needed to know about how textile designers, especially those beginning to develop digital reflective practice, particularly in Pakistan. The purpose of the present study is to explore the digital reflective process throughout the studio design through digital audio and video recordings. A multiple case study methodology was used in the present study so that the process of development of digital reflective practice could be studied.

Chapter 3. Methodology

The literature review demonstrated the importance of digital reflective practice in education, particularly in textile design studio practice. It is concluded and postulated from the previous literature that undergraduate students will experience benefits if they use tools such as audio and video to cultivate the practice of reflection. The main objective of this research is to gain an increased understanding of how digital reflective practice looks to design educators and students and their narrative of creativity concerning DRP. This chapter describes the research questions, methodology, paradigm, and theory underlying the current multiple case study. A presentation of data collection procedures and data analysis procedures follows this. The following are key questions I intended to address in the planning phase of the research.

- *How do design students and educators perceive digital reflective practice?*
- *In what ways do design students and educators perceive the relationship between digital reflective practice and creativity?*
- *How do design students and educators view digital reflective practice can be used more effectively in textile studio practice?*

3.1. Theoretical Perspectives

The idea of digital reflective practice makes sense in incorporating digital technologies into studio education. Different models have been used to explain technology use, such as the DeLone and McLean (D&M) model, the "most common ground theory in e-learning acceptance literature" is the technology acceptance model or TAM (Dorobat, 2014; Šumak, Heričko & Pušnik, 2011). Fred Davis initially presented TAM in 1989 to explain and predict why users use information and technology systems by modifying Ajzen's Theory of Reasoned Action and Theory of Planned Behaviours (Davis, 1989; Marangunic & Granic, 2015). Another popular model used to explain this is the technological pedagogical content knowledge, or TPACK, the framework presented by Mishra and Koehler (2006). This framework proposes that teachers must have three areas of overlapping knowledge to use technology in learning successfully: content, pedagogical and technological knowledge. Developing good educational content requires thoughtful use of all three areas. With cases like this, TPACK provides a strong example of a model where pedagogy and technology use are strongly linked. Altinpulluk and Kesim(2019) found that TAM was the most used model in research related to learning management systems. TPACK will be the appropriate framework for analyzing participants' perspectives using electronic devices in classrooms and connected to certain behaviours. TAM was a potential theoretical framework around technology acceptance.

Furthermore, TPACK looked at technology, pedagogy, and content knowledge integration from different perspectives. Puentedure (2016) and Swallow and Olofson (2017) argued that technology integration, even though it is an emerging topic, can be better studied from theoretical frameworks of 'Substitution, Augmentation, Modification, and Redefinition (SAMR). Puentedure (2016) investigated and proposed SAMR as a possible and viable solution for high-level technology integration in the classroom. The framework provides a blueprint for understanding how practitioners can effectively use and integrate technology in the classroom to enhance students' achievement from a knowledge-based perspective.

This study's primary focus is to examine the development of reflective practice in the context of textile studio design, with digital video being used as a supportive tool. While models such as TPACK and TAM identify factors that influence technology adoption and use, it is important to clarify that the main objective of this research is to investigate how reflective practice unfolds and impacts students'

creativity. This study's theoretical perspective is rooted in constructivism and constructivist interpretivism. While technology use and adoption are discussed within the reflective practice framework, it is crucial to emphasize that the central goal is to explore the reflective process and its influence on creative outcomes. By narrowing the focus of this study to reflective practice and positioning technology use and adoption as factors within that framework, we can develop a deeper understanding of the complexities of the reflective process and its impact on creative outcomes. This approach aligns with the constructivist-interpretive lens, allowing for an in-depth exploration of the dynamic relationship between reflection, technology, and creativity in textile studio design.

Constructivism

John Dewey (1859-1952) was an American philosopher and educational reformer. He organized the Progressive Education Association, which was dedicated to reforming the traditional teaching methods and curriculum (Foote, Trofimovich, Collins, Soler, 2013; Tozer, Violas, Senese, 2009). Dewey advocated moving from a teacher-centred practice to a more student-centred learning model (Mooney, 2000; Radu, 2011; Tozer, Violas, Senese, 2009). The central idea of his progressive educational theory is that meaningful knowledge is gained from experience. From that foundation, he asserted that education should focus on the learner and be based on learner interests, be activity-oriented, and gear toward addressing and solving social problems (Tozer, Violas, Senese, 2009). Bruner (1977) advocated moving from a teacher-centred teaching practice to a student-centred one. He believed knowledge is created as learners actively learn and that the material or information must be encountered in its context. Therefore, he believed learning best happens through discovery (Bruner, 1977; Marlowe & Page, 2005).

Since the turn of the 21st century, technology has continued its exponential explosion worldwide. That expansion has touched virtually every aspect of daily life, and the arena of education has not gone untouched. How citizens receive and distribute information has seen a radical change as virtually all print media forms have been replaced with electronically transmitted media. These factors have altered the familiar roles of educators and students (Ertmer & Newby, 2013; Siemens & Tittenberger, 2009). Advances in technology have altered many concepts in education, prompted much discussion about how learning happens, and fostered the notion that knowing how to find information is more important than knowing that information (Siemens & Tittenberger, 2009). During the same time frame, constructionism as a learning theory has gained much support. Applefield, Huber, and Moallem (2001) said it has brought about a "paradigm shift in the epistemology of knowledge and theory of learning" (p. 4). Constructionism is at the root of many evolutionary changes in education, changes that may be seen reflected in national learning standards (Marlowe & Page, 2005).

Constructivist interpretivism

Every aspect of the present research was seen through the constructivist-interpretive lens. As the theoretical framework gets dissected, connections between the research undertakings and the chosen theoretical framework will be addressed. Constructivism- interpretivism has fundamental assumptions ontologically, epistemologically, and methodologically (Guba & Lincoln, 1994), influencing the data collection, analysis, and methods used to build trustworthiness. Ontologically, the fundamental assumption of constructivism is “relativism”, which according to Guba and Lincoln (1994) means, “constructions are not more or less ‘true’ in an absolute sense…constructions are alterable, as are their associated ‘realities’” (p. 111). Relativism can be understood by saying that “there is no absolute truth, only truth construed relative to the individual” (Narayan, Rodriques, Araujo, Shaqlaih, & Moss, 2013, p. 170).

Consequently, this was why data was collected from three different types of participants through semi-structured interviews. The purpose was to build a complex understanding from the individual’s

perspective. This method does not result in finding an absolute truth but supplies multiple ideas about the same topic. Regarding data analysis of these perspectives, the researcher utilized overreading, given this method looks for implicit rather than explicit meanings (Poirier & Ayres, 1997). When one searches for explicit meanings, this insinuates an absolute truth; implicit meanings do not. For trustworthiness, data triangulation and thick, detailed descriptions pair well with relativism considering triangulation requires multiple participants to be used as opposed to one data source, which may represent absolute truth. Moreover, thick, detailed descriptions do not represent an absolute truth because they are explanatory and provide a narrative interpretation rather than an absolute one-word or one-sentence answer.

Epistemologically, the fundamental assumption of constructivism-interpretivism is transactional subjectivism (Narayan, Rodriques, Araujo, Shaqlaih, and Moss, 2013, p. 170). According to Guba and Lincoln (1994), this means "the investigator and the object of investigation are assumed to be interactively linked so that the 'findings' are literally created as the investigation proceeds" (p. 111). For data collection methods, transactional subjectivism fits well with interviews in that the investigator and the participants are linked, and some research results were recognized during the process. According to Narayan et al. (2013), "the basic methodological assumption of constructivism is hermeneutic dialecticism" (p. 170). This suggests "that individual constructions can be elicited and refined only through interaction between and among investigator and respondents" (Guba & Lincoln, 1994, p. 111). For the data analysis, this meant the researcher used thematic analysis, which "is a method for systematically identifying, organizing, and offering insight into patterns of meaning (themes) across data set" (Clark & Braun, 2014, p. 57). The researcher and the participants indirectly interacted as the researcher sought to make meaning of the participants' words and practice. The researcher and participants interacted through online interviews.

Regarding data analysis, the investigator was linked with the participants and interpreted the data created by the participants. This included coding and thematic analysis of the data. Following the interpretative piece, the researcher used the trustworthiness method, identified as member checking to determine if the analysis matches the intended messages of the participants. The participants and the researcher were also linked in other ways, given they both have educational backgrounds that influenced their responses and analysis.

This interpretive multiple case study was designed to explore the perceptions, beliefs, and thoughts of teachers, heads of departments (HoDs) and students regarding incorporating digital video reflection in textile studio design courses and experienced by students. The lens through which this research was approached was the constructivist-interpretive lens. This paradigm influenced every decision made before, during, and after the research. To reiterate this point, Mackenzie and Knipe (2006) stated that "without nominating a paradigm as the first step, there is no basis for the subsequent choices regarding methodology, methods, literature, or research design" (p. 2). According to several qualitative research leaders, the constructivist-interpretivism paradigm pairs well with the qualitative approach to research (Mackenzie & Knipe, 2006; Merriam, 2009; Stake, 1995).

3.2. Research Paradigm

Qualitative research is interpretive, seeking to make sense of human social phenomena that occurs naturally in the world, primarily when elements or variables cannot be studied in isolation (Alhamdani, 2016). Qualitative research, of which empirical, descriptive case study is one form, utilises an inductive logic model. Whereby explanatory or interpretive theories are derived from an analysis of accumulated data; and hence appear at the end or conclusion of the research (Creswell, 2015). As a distinctive feature of this research framework, exploratory research operates intended to identify issues, themes, problems, constructs, or questions in evidence in the scenario being investigated, out of which emerge tentative theories that merit further study. A qualitative research approach is functional in applied fields such as education, as the purpose is to understand the phenomenon of

interest from the participant's perspective (Merriam, 2009; Kılıçoğlu, 2018). Using qualitative methods, the researcher can gather data through observations and interviews and analyse relevant study documents. The findings of qualitative studies usually take the form of themes and categories that emerge with the interpretation of incoming data. Using themes and categories as a basis of understanding, qualitative researchers can move from their particular case of study and make certain generalisations concerning the limitations of the study (Kılıçoğlu, 2018).

Merriam (2009) insisted that qualitative research should be conducted through the lens of the constructivist-interpretivism paradigm, given "qualitative researchers are interested in understanding the meaning people have constructed, that is, how they make sense of their world and the experiences they have in the world" (p. 6). Moreover, Mackenzie and Knipe (2006) cited multiple researchers when they stated, "the interpretivist/constructivist paradigm generally operates using predominantly qualitative methods" (p. 7). Additionally, the constructivist- interpretivism world views align with the qualitative research methodology (Leavy, 2017). According to Leavy (2017), "working within this paradigm, you prioritize people's subjective understandings and multiple meanings in the research process" (p. 129).

Qualitative research explores, describes, explains, uncovers, or finds meanings within an experience to build a thorough understanding of a phenomenon or experience (Leavy, 2017). Qualitative research also seeks to comprehend the experiences of others through an in-depth exploration of the subjects they are studying (Bhattacharya, 2017). An essential part of this research was to create extensive knowledge from three different viewpoints about the experience of digital reflective practice used by textile design students. This aligns with the constructivist-interpretive paradigm in the sense that the knowledge will be constructed through multiple participants' perspectives. Moreover, knowledge was created by both the researcher and the participants through analysis of their thoughts and views. The participants reflected on their processes, perceptions, and experiences. These data collection experiences aligned perfectly with the interpretive paradigm, which is utilized to determine how the participants "assign meanings to events, situations, and so forth" (Leavy, 2017, p. 42) during the research process. This allows for subjectivity based on how the researcher views and understands human beings and their interpretations of their practice.

Ontologically, the researcher followed the qualitative paradigm since human beings are dynamic, and their experiences should be viewed from various perspectives to provide a deeper understanding of their world. If we examine decisions, experiences, and opinions through one piece of data, we limit the potential of developing rich, complex data, which we need to fully understand those ideas (Merriam, 2009; Stake, 1995). Therefore, when studying the behaviour and perceptions of human beings, the researcher understood that it was impossible to leave out subjectivity within this research, and a qualitative paradigm justifies subjectivity (Bhattacharya, 2017). This also provides evidence for rejecting the quantitative approach to this research. According to Leavy (2017), the goal of quantitative research is to be objective during the quest for answers that will "reveal patterns, correlations, and causal relationships" (p. 9). Quantitative research follows the positivist ideology, which believes that the researcher and the participants should be detached from each other. However, this study built an in-depth understanding of educators' and students' perspectives, experiences, and thoughts, which involved subjective interpretations. During and after the data collection, the researcher interpreted the words and nuances of the participants.

The purpose of selecting this paradigm was two-fold. First and most importantly, these are the world views of the researcher and are believed to be the lens through which one should examine human behaviour and experience. Secondly, this paradigm fits well with qualitative research and case study methodology (Leavy, 2017; Mackenzie & Knipe, 2006; Merriam, 1998; Stake, 1995; Thomas, 2016). To solidify this point, Stake (1995) discussed the epistemological stance of qualitative researchers as "existential (non-determinist) and constructivist" (p. 43). Additionally, Stake (1995) stated that "most qualitative researchers are relativists" (p. 102), which is the ontological view of the constructivist-

interpretivism paradigm. Given the paradigm choice, this research was conducted through the qualitative approach, while the methodology used was the case study. Merriam (2009) made a general connection between the qualitative approach and case study methodology y when she stated, “qualitative case studies stem from the fact that this design is chosen precisely because researchers are interested in insight, discovery, and interpretation” (p. 28-29). Qualitative research seeks an in-depth understanding of the experiences of others, and case study research has the same intent (Leavy, 2017; Merriam, 2009; Stake, 1995).

To explore and understand how DRP affect the creativity of textile design students, the researcher had to examine the meanings behind the participants’ experiences deeply. The research questions for this study explored the perceptions and thoughts of educators and students when they experience the application of DRP in a textile studio design course. This coincides with the constructivist-interpretivism lens because the “interpretive paradigm allows researchers to view the world through the perceptions and experiences of the participants” (Thanh & Thanh, 2015, p. 24). Moreover, the interpretive paradigm lends itself to qualitative studies since it focuses on one of the main goals of qualitative inquiry, interpretation (Thanh & Thanh, 2015). Thanh and Thanh (2015) compared the interpretivism paradigm with the positivist paradigm to solidify the point about perspectives: “Differing from positivists who often accept only one correct answer, interpretivism is much more inclusive, because it accepts multiple viewpoints of different individuals from different groups” (p. 25).

Furthermore, this allowed us to understand why the quantitative research approach would not be appropriate for this interpretive study. When considering an issue from multiple perspectives, the researcher can develop a more comprehensive understanding of the reasons behind the subject. To get multiple perspectives in qualitative research, the researcher determined that multiple case studies would be the methodological selection for the research design.

3.3. Case Study

Case study research is a form of social science research which can be qualitative or quantitative. Yin outlines three different types of case studies. He stated that a case study could be 'explorative', 'descriptive' or 'explanatory', and it can be either of these using single-case or multiple-case studies (Yazan, 2015). Yin (2014) defined a *case study* as "an empirical inquiry that investigates a contemporary phenomenon (the 'case') in-depth and within its real-world context, especially when the boundaries in-depth phenomenon and context may not be evident" (p. 16). This study accorded with Yin's definition, for it was an empirical inquiry that investigated creativity when teaching students about textile design. Case study inquiry contended with the unique demands of such an investigation in a real-life setting where the examined factors or variables outnumbered data points (Yin, 2014). Key features of the case study method designed to respond to these distinctive demands include a unit of analysis or bounded system that circumscribed the case and a convergence of multiple data sources that triangulated evidence and, thereby, supporting the credibility of findings (Merriam, 2009; Stake, 1995; Yin, 2014).

First, the case study methodology selection aligned nicely with the paradigm. According to Thomas (2016), “case study and interpretative inquiry are natural bedfellows, since each call for rich, intensive understanding” (p. 148). In another piece of writing, Thomas (2016) noted that “sociology, education, and psychology have tended to see the case study in an interpretivist frame” (p. 512). Due to the choice to use the constructivist- interpretivist theoretical framework in this research, the researcher selected both Stake (1995) and Merriam (2009) to help shape this interpretive case study. According to Stake (1995), “interpretation is a major part of all research” (p. 9). Furthermore, Stake (1995) demonstrated his ontological view through a constructivist lens when he writes, “the qualitative researcher tries to preserve the multiple realities, the different and even contradictory views of what is happening” (p. 12). Merriam (2009) also displayed this ontological and constructivist view when she

writes, “multiple realities are constructed socially by individuals” (p. 4). Due to these two case study researchers adhering to the theoretical framework of this study, the choice was clear.

An interpretive case study design is an approach to qualitative research aimed at understanding the meaning and social context of the phenomenon under investigation (Merriam, 2009). The interpretive case study design is appropriate when the research aims to explore, explain, or describe a phenomenon in a particular context (Stake, 1995). The current study aims to explore the influence of digital reflective practice on the creativity of Pakistani textile design students. Therefore, the interpretive case study design is appropriate as it allows the researcher to explore the phenomenon in a particular context and understand its meaning and social context. Additionally, the interpretive case study design aligns with the research questions and limited researchers are found on the subject matter. The exploratory type of study is appropriate to generate new ideas and insights. The rationale for choosing an interpretive case study design with exploratory purposes is based on the phenomenon under investigation, research questions, limited research, and contextual understanding.

Before beginning any case study research, one must define the case itself or the “unit of study” (Merriam, 1998, p. 27) and what boundaries define the case (Merriam, 1998; Stake, 1995). According to Stake (1995), “not everything is a case…[and] the case is a specific, a complex, functioning thing” (p. 2). Merriam (1998) added to this by stating the following to case study researchers, “see the case as a thing, a single entity, a unit around which there are boundaries. I can ‘fence in’ what I am going to study” (p. 27). In this research, the textile design department (in a Pakistani university) was a case. To “fence in” this case, the researcher wanted to study a current real-world phenomenon about the perceptions, beliefs, thoughts, and thought processes of textile design educators and students by open-ended questions. Four departments in four different universities were selected for the present research. This interpretive multiple case study aimed to examine perceptions, beliefs, and thoughts. Also, thought processes individually with three different categories (i.e., teachers, Head of Departments, and students) of participants utilizing open-ended questions. This scenario strongly appealed to a case study approach, given that the researcher purposefully chose fewer participants to examine this circumstance thoroughly (Merriam, 1998).

The case study method was chosen for two reasons. One, the topic selected was complex and the thoughts, perceptions, beliefs, and knowledge of teachers, HoDs and students implementing DRP in the textile design studio course. According to Merriam (1998), "a case study design is employed to gain an in-depth understanding of the situation" (p. 19). Stake (1995) added to this by stating, "case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (p. 11). It was evident from the literature review that more research is needed about digital reflective practice and textile design education, particularly in the Pakistani context. The in-depth research and analysis of a case study allowed the researcher to deeply explore the participants' thought processes, who incorporated open-ended questions. By examining these traits, the researcher could better understand the effect of DRP on students' creativity, challenges, and opportunities for future use.

The second reason for choosing the case study method involved the explanatory and descriptive nature of the research questions. Yin (2014) noted that explanatory and descriptive research questions naturally lead to using the case study methodology, resulting in an extensive analysis of the phenomenon. Additionally, this study aimed to obtain rich data on the perceptions, beliefs, knowledge, and thoughts of textile design teachers, HoDs and students; the case study methodology endorses that. According to Flyvbjerg (2011), “case studies comprise more detail, richness, completeness, and variance” (p. 301). Collecting rich and variant data permitted the researcher to elaborate more extensively on the topic.

Additionally, the interpretive approach was chosen since the participants' experiences were studied while creating and utilizing open-ended questioning. Ultimately, the researcher will not bracket himself from the participants or the research and seek to interpret the participants' meaning making. According to Larkin, Watts, and Clifton (2006), Interpretative analysis allows the researcher to deal with the data more speculatively: to think about 'what it means' for the participants to have made these claims and to have expressed these feelings and concerns in this particular situation (p. 104).

The case study is a qualitative in-depth, and holistic approach to a phenomenon based on multiple types of evidence collected in a real-life context' (Rebolj, 2013, P.32). A qualitative case study of a specific group working collaboratively using digital reflective tools would be the most appropriate approach. It also provided data from multiple categories of participants and ultimately offered an in-depth picture and rich exploration of the topic. For the present study, participant selection and an interview protocol were developed following the direction of Hunter (2012). Different study participants were chosen for multiple stages as they are often used to collect qualitative data to review or develop other research materials (Barbour, 2015). This research study aimed to fully understand what the participants attempted to convey in the data, which called for an interpretive approach. To better understand how the research was approached and the methods used, the researcher must reiterate and describe in more detail the paradigm through which all the choices for this study began and ended. Conducting this interpretive multiple case study research involved exploring a critical aspect of the student's experiences: digital reflection, textile design, and creativity.

3.4. Multiple Case Design

It has been mentioned before that textile design departments in various universities are case studies of the presented research. A multiple case design structured this inquiry to facilitate case replication and, thereby, strengthened the evidence in support of findings. Yin (2014) urged researchers to choose multiple over single case designs whenever the option and resources to do so are available given the more significant potential for robust findings afforded by more than one case. Yin (2014) compared the logic of replication applied in multiple case design to that of experimental design. The relatability of findings in multiple cases and experiments provides compelling support for the theoretical propositions underpinning research (Stake,2006).

Multiple case studies are not typically employed to determine the prevalence of a given phenomenon within the general population; statistical generalisation is not the goal. Instead, according to Yin (2014), case studies strive for analytic generalisation. They aim for robust findings that buttress evidence in support of theoretical propositions. The analytical generalisations or lessons learned from a multiple case study can form working hypotheses to explore and conceptualise circumstances that extend far beyond those in the original study (Yin, 2014). Thus, the examination of multiple cases in the present study provided insights that may be meaningful to design education researchers and practitioners both in and outside the textile design field.

In contrast to a single case study, the rationale for making this a multiple case study consists of the wide variety and unique qualities which may be found in and across individual graduate student artists enrolled in similar but different locations and contexts (Takahashi & Araujo, 2020). The distinctive textile design student experiences contrasted against similar conditions may provide unique insights about varying influences on developing their artwork and ideas. For example, traditional narrative research typically seeks to tell an individual's whole story over time (Creswell, 2013). For this research project, individuals' stories were focused on the change in their ideas and DRP over time. More importantly, the present study's fundamental values are discovering how students and teachers interpret, imbue, or ascribe meanings to the student's creativity and DRP. It is mentioned before that questionnaires & interviews are typical data collection sources in the case study methodology intended to use in the proposed study (Yin,2014). Yin (2014) also prioritised two

case studies compared to a single case study as multiple-case design gathers multiple perspectives that enhance the validity and reliability of research.

3.5. Context

About 188 universities and higher education institutions in Pakistan are recognized by the Higher Education Commission (HEC). About 45 institutions in Pakistan offer undergraduate degrees in Textile Design & related disciplines. Most of the textile design courses are based on studio practice. The present study was a departmental case study based on the methodology of multiple case study(s) in four departments of different institutions in Pakistan. The research was conducted in a textile design undergraduate program that focused on the assignment of the studio design course. The present study was executed at universities with no affiliation to the researcher. While intimate knowledge of the setting and phenomenon may provide some advantages, there are dangers involved, such as having predetermined expectations that may compromise the data. According to many experts in the field, studying within one's institution or backyard 'should be avoided unless there are compelling reasons to do so' (Zulfikar, 2014, p.380).

The study was conducted in a textile studio design course taught in four different departments of four different institutions/Universities. The textile design course was designed to teach skills and knowledge of industrial textile design for the 3rd semester and above students, including experiences and assignments to prepare designers for the realities of the profession. The studio class was designed to meet face-to-face and online to complete tasks and practice in their studios. Allison (1994) pointed out that art and design practice is based on the artist's expression of ideas and materials. So qualitative research methods are appropriate for research in this discipline. For the present study, assignments provided by the instructors are based on aesthetics and techniques. The development and creative journey of the students are linked to interaction with peers and teachers. Studio-oriented courses were suitable for the case study method, yet textile design instructors needed to document the design process (Leavy, 2017). It was also experienced by the art and design instructors that teachers need to be more active in recording the students' conversations.

As mentioned before, the presented study was planned to explore the effect of digital reflective practice (DRP) on students' creativity in a textile design course. So, it was essential to understand the curriculum and classroom settings. A design studio format is often used in the textile design curriculum. Design studio settings were based on learning by doing. Students interact with the instructor in various phases to understand, explore and solve the problem designed by the instructor or expert (Niekerk, Ankiewizc & Swardt, 2010). Students were free to be creative and productive but within the boundaries defined by course instructors at the beginning of the assignment/project (Vasconcelos, Neroni, Cardoso & Crilly, 2017). Design studio assignments encourage producing an original artefact with a creative process (Ha-Brookshire & Hawley, 2014: Johnson, Penny & Gordon, 2009). Collaboration and environment play a significant role in developing technical and aesthetic design (Corazzo, 2019). Figure 3 shows an overview of the design studio process and the interaction between the environmental factors, product, and operation.

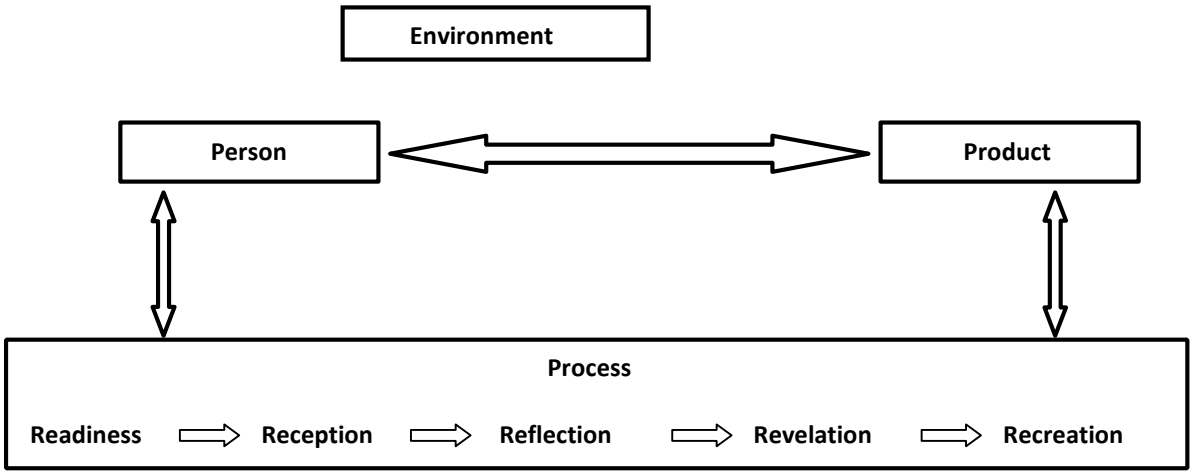

Figure 3: Framework of Design Studio Process (Hasirci & Demirkan, 2007)

The textile designers' visualizations and representations could be created in any art medium, for example, pencil on paper, fabric swatches, or computer imaging. The resulting materials could be sketches, paintings, collages, or fully finished projects. These are essential manifestations of how the designers work as they are considered external representations of the internal imagery in designers' minds. Many studies supported the idea that the production of different visualizations results from creative activity. Visualizations are the internal creative processes (Manolya & Gero, 2011). For example, one study suggests sketching is like off-loading the internal imagery in our working memory while the ideas are fresh. Visualizations and representations are a low-cost and efficient way for designers to record thoughts and develop characteristics of products that will be reinterpreted and reworked throughout the design process and is an ideal way to see creative movements in the designer's work (Miquel, Sungwoo, Iestyn, Steve, & Scott, 2009).

One of the critical features of the proposed study was the inclusion of DRP with studio assignments. The digital reflection was achieved as audio and video recordings (AVRs). AVRs required students to record their design development process in the studio class or at home. The students recorded themselves working on the studio project and then reviewed their recordings in-depth for reflection. The assignment's concept was to expand on outside observation and allow students to observe their process and study their learning and development. The AVRs required students to choose clips from their original footage and use simple video editing software to arrange the selected clips into a concise 3 to 5 minutes for their submission. Students submitted three videos at the end of the assignment. One was recorded at the beginning, the second was in the middle, and the third was at the end of the assignment. The assignment was also listed in the online course website/learning management system and had links for students to access the detailed instructions of all the required steps using a digital video camera and video-editing software. The researcher did not interact with the students directly; the concerned teachers planned and executed all the activities.

Four institutions were selected for the present study based on the criteria discussed in the sampling section. These institutions were suitable for four reasons. First, the duration of the course ran for a specific period. Second, all the institutions focused on the creativity of students' work. Third, the students worked collaboratively and used technology in their creative work. Fourth, the final products were evaluated by experienced faculty members. All the universities follow the higher education commission Pakistan (HEC) curriculum guidelines. All the selected departments tended to offer online classes in case of any emergency or need. As Harrison, Birks, Franklin, and Mills (2017) stated, all the main ingredients of a practical case study were present in all the selected departments.

Approximately 45 departments offer bachelor's degrees in the textile design discipline in Pakistan. Initially, communication was made with various universities to seek consent to conduct the present study. The case was the department, and the selection parameters are based on the following criteria.

- University/ College offers an undergraduate program in textile design.
- Higher education commission Pakistan (HEC) should accredit the degree of the selected program/department.
- Relevant department having at least 4th semester of textile design in an undergraduate program.
- University which provides online education in case of any emergency or unavoidable circumstances (i.e., lockdown)

Case study 1 is one of the leading textile design departments in Pakistan, located at a well-known private university. The department offers a variety of courses, including Textile Print Design, Textile Studio Practice, Textile Design Major, and Textile Surface Design. The department has an average of 20 students in each class. The students in the department are known for their creativity and innovation, and the department has a strong focus on practical skills and hands-on learning. The department has a culture of reflective practice, with students encouraged to reflect on their work and learn from their mistakes. The department is also known for using digital technology in textile design, with students using software such as Photoshop and Illustrator to create their designs. Case Study 2 is located at a well-known public university in Pakistan and is known for its innovative and experimental approach to textile design. The department has an average of 20 students in each class and encourages a culture of reflection and self-critique among its students. The department strongly focuses on the creative process, with students encouraged to experiment with different materials and techniques. The department is also known for its engagement with portfolios, with students encouraged to create and maintain a portfolio of their work throughout their studies.

Case study 3 is the department of a private-sector university in Pakistan. The department has an average of 30 students in each class and encourages a culture of critical reflection among its students. Digital technology in textile design is also emphasized, with students using software such as Photoshop and Illustrator to create and enhance their designs. Case study 3 is a newly established department as compared to other cases. Case study 4 is in a suburban area of Pakistan. Its location is different from other cases. The department has an average of 30 students in each class, encouraging a culture of experimentation and risk-taking among its students. The department emphasizes using digital technology in textile design, and students are encouraged to explore new digital tools and software to enhance their designs.

In the present study, the selection of teacher and student participants for interviews was based on specific criteria. For the selection of teachers, a purposive sampling approach was employed. The criteria for selecting teachers included their expertise and experience in teaching textile design studio classes and their incorporation of digital reflection practices (DRP) in their assignments. The selection of teachers was communicated through a formal invitation process, where the researchers explained the study's purpose and significance, the specific selection criteria, and the voluntary nature of participation. Teachers who met the criteria were invited to participate in the study, and their agreement to be interviewed was obtained through signed consent forms.

Regarding the selection of student participants, a random sampling approach was used to ensure representation from different cohorts and backgrounds within the textile design studio classes. The random sampling method was communicated to the students through a general announcement made in the class (Etikan, 2016). The researchers explained that a subset of students would be randomly selected for interviews to gather a diverse range of perspectives on their experiences with digital reflection practices. It was emphasized that participation was voluntary, and students were allowed to opt out if they did not wish to be interviewed. The students who agreed to participate provided

informed consent by signing consent forms. For the selection of student participants in the interviews, a first come, first serve basis was employed. Initially, three students were selected from each case based on their prompt response and willingness to participate. However, in Case Study 2, one student later withdrew their commitment. As a result, two students were ultimately interviewed in Case Study 2. In Case Studies 1, 3, and 4, three students were interviewed following the first come, first serve approach, ensuring a fair representation of perspectives within those cohorts. The research was conducted with students of the Bachelor of Textile Design. Students were at the 6th-semester level, so they should have an idea of studio designing and have a particular skill level. Four classes comprising 15 to 25 students each (varied in different institutions) completed a textile studio assignment based on DRP with their course teachers.

3.6. Researcher's role

As a textile design teacher for 15 years, the researcher understood that his experiences affected his analysis and perspectives. Moreover, the researcher has worked with curriculum planning of textile design and developed curricula on the national level. The researcher understood that his past experiences influenced his data collection and analysis subjectivity. Given that the researcher has taught textile design for over 15 years at the university level, his understanding of the content within this research study would be considered comprehensive. Due to this experience level, the researcher was reflective during and after the research process and understood that his experiences could influence the interpretations.

However, every attempt was made to avoid an overabundance of influence from the researcher. Moreover, the constructivist interpretivist theoretical framework was the lens through which this research was viewed, so the interpretations and input were necessary and appropriate. However, the researcher must make the audience aware of his experiences and how those have influenced different aspects of the research. When reviewing the researcher's role, he must also review the role within the chosen methodology. For this study, the researcher chose an interpretive case study methodology. It is important to be reflexive when using any qualitative research methodology where the researcher significantly influences the research being conducted. According to Sutton and Austin (2015), "reflexivity requires researchers to reflect upon and clearly articulate their position and subjectivities (world view, perspectives, biases) so that readers can better understand the filters through which questions were asked, data were gathered and analysed, and findings were reported" (p. 226). Due to the interpretative nature of this methodology, the researcher's reflexivity was established in the theoretical framework, where ontological, epistemological, and methodological viewpoints were revealed. Understanding the role and viewpoints of the researcher is important, but the research study must also present the participants and why they were chosen to build this study.

The researcher's supervisory role could have produced Hawthorn effects and other issues that influenced the participants' actions and responses (Oswald, Sherratt & Smith, 2014). For this reason, the researcher's part was strictly that of a researcher. The researcher worked as a facilitator to ensure that the data collected was free from the power issues and inequality that inherently may exist in relationships between superiors and subordinates. Thus, researching solely as a researcher for the present study provided participants with a greater sense of freedom to elaborate on their digital reflective practice experience and its relationship with creativity. I mentioned that I did not intervene in the assignment planning and execution. I did not interact with students during the application of DRP in their student assignments. My affiliation with all the cases was only as a researcher. Participation in the current study was voluntary, and my relationship with the cases did not involve any financial matter or remuneration. In this interpretive research design, I was a participant observer. Interpretive research is a qualitative method where observation rather than hypothesis testing informs a detailed understanding of a particular subject. Interpretive research methods can analyse

specific behaviours within specific contexts and situations, focusing on the decision-making process and providing deep insight into the complex world of lived experience (Schwartz-Shea & Yanow, 2012).

3.7. Procedure

The present research employed a participatory case study approach. A participatory case study was developed whereby teachers' expertise was valued (Cober, Tan, Slotta, So & Köning, 2015) and utilised in its design. This approach is predicated on knowledge generation as a collaborative process (Denzin & Lincoln, 2011). Heron and Reason (1997) viewed research collaboration, what they call 'co-operative inquiry', to be complementary to constructivism as, conceptually, "final or absolute accounts of reality are impossible" (p.276). They assert participatory research practices can lead to different types of knowledge, including practical and experiential: apposite to research about a professional practice like this study.

Additionally, Cober et al. (2015) highlighted that co-design involving teachers and students as participants yield "more ecologically appropriate, viable, and resonant materials and activities" (p.203). The democratic roots of the participatory case study were important, demonstrating my respect for teachers' expertise and influencing my positioning of student participants. My study focused on the phenomenon of DRP incorporated by teachers and experienced by students in textile design studio classes. I aimed to foreground their experiences, giving them a more significant role than only interviewees. The participatory elements grounded my multiple case study in 'real-life situations in progress' (Creswell, 2013; Yin, 2014), further endorsing this approach to fulfil the study's objectives.

After selecting the institution, the research was divided into three primary stages. The first stage is the planning and execution of studio assignments by the teachers. This phase also included the initial interviews with the course teachers. Teachers incorporated digital reflection in studio assignments and observed the students. The second phase included using DRP by the students in the textile design studio class. This phase also comprised 2nd interview with the teachers. The third phase included interviews with teachers, Head of Departments (HoDs), and students. Details of each stage are discussed afterwards. Following is the 3-staged depiction of the current study research process.

Stage 1: the planning phase of studio assignments and 1st-interview with teachers

Before the first interview with the teachers, the research proposal, participation information sheet, and interview protocols were shared with the course teachers. Stage 1 used course teachers to develop the assignment guidelines to combine the idea of DRP in the existing scheme of studies and define instruments for assessing creativity and other parameters of textile design. Initially, studio assignments were planned according to DRP by the teacher. The role of a teacher is different in studio courses from the conventional classroom method. When teachers are assigned any task in the design studio, they continuously interact with students. The first data collection included an interview with teachers. The interview was before the beginning of the assignment. The purpose of the first interview was to allow the researcher to develop a familiarity with the department, students, and the program and, most importantly, an understanding of the issues to develop questions to begin the qualitative phase of the research. Each participant teacher who took part was asked questions about creativity, digital reflective practice, and the existing teaching method. The questions used in these interviews emerged from the research on DRP and creativity. Inquiries were developed to explore how effectively DRP supported creativity and whether digital technology changed the creative process, the final product, or both. Objectives of the research were explained, and the scope of the study and elaborated on points where required. At the end of the first interview, the teachers discussed a framework for adding DRP to the course contents and assignment handout.

Stage 2: Execution of studio assignment and 2nd interview with teachers

At stage 2, the teacher applied the assignment in the textile design studio course. Courses being taught during fall 2020 & spring 2021 and had to be a textile design studio within the participating department. A purposive sampling method was used due to the limited number of eligible courses and resource constraints. One studio design course was selected with an adequate number of undergraduate students (minimum 15) and an instructional balance between declarative and procedural knowledge. The course also had an appropriate number and type of course projects and had a teacher willing to participate in the study.

At stage 2, the students had been experiencing DRP in the studio assignment. Participants had been developing designs in this phase's textile design studio class. It is mentioned before that, generally, the teacher provides guidance and limitation of the assignment and the submission process and requirements of the designs. Students had been introduced to the notion of DRP by the teacher. The teacher communicated with students about the possibility of digital reflection on the design process. Students were also informed that this would be an optional activity and that using DRP would not affect the studio assignment's grades. The current study did not influence students' design development. Besides, this was an optional activity; all the students completed their video reflections. Design development was performed as a routine textile design studio class activity. 2nd interview with teachers was conducted in this phase, and they were asked to share their observations about students' experience of DRP. Feedback from students and HoDs was gathered in the 3rd phase of data collection.

Stage 3: Interview with teachers, Heads of Departments (HoDs) and students

During the research, interviews with the teacher were performed to gather qualitative data on the teacher's perceptions of students' creativity and use of the DRP. Course teachers were interviewed at the beginning, middle and end of the studio assignment. Stage three included 3rd interviews with the course teachers. The interviews aimed to discuss the problems and possibilities of DRP and its relation to students' creativity. Another purpose of the teacher's interviews was identifying areas in textile education that could be improved through DRP. Interviews with the teacher were performed at the end of assignments to summarize their experience.

Stage three of the research also used the heads of the department as an expert for online interviews to review and refine the phenomenon of DRP. Expert feedback was required for future use or pointing out the areas that could be improved by using DRP. The frequency of the interaction will be once after the completion of assignments. One interview was conducted with the HoD or equivalent position. Interviews with HoDs provided a holistic perspective of DRP in textile design and other related disciplines. It was attempted to determine whether the participants viewed digital technology as an effective tool supporting the creative process. It was also inquired about the ways students used digital technology. There were several references to the various uses in the literature. The questions focused on whether the students used digital technology merely as a source or repository of ideas and models or, more fully, treating it as a partner in all creative process phases. Expert views were asked about digital technology's value in the design context concerning their skill & creativity. It was also asked to identify any further benefits to be accrued through digital reflective practice and challenges associated with this phenomenon in Pakistani higher education scenarios and culture.

Data was not collected from observation during the class progress. Participants students were held to gather qualitative data through interviews with three students from each three cases (case 1, 3 &4) and two students from case 2. Students were selected based on random sampling. The student's interview was conducted online at the end of the assignment. The participant students were asked to

share their perspectives about DRP and the creativity of their work. Questions to the students were aligned with the study's objectives, including their perception of digital reflective practice, the relationship of DRP and creativity and the effective use of DRP for further use.

A detailed questionnaire of teachers, HoDs and students is attached in the Appendices section of the thesis.

3.8. Data Collection Instruments

First and foremost, Mackenzie and Knipe (2006) discussed the alignment between theoretical frameworks, methodological orientations, and data collection. Mackenzie and Knipe (2006) noted that the constructivist-interpretivism paradigm aligns well with qualitative research and the data collection methods of interviews. Stake (1995) confirmed these data collection methods for case study research when he states, "when we speak of methods in case study, we are again speaking principally of observation, interview, and document review" (p. 114). Merriam (1998) agreed with Stake (1995) in stating that for case study research, "all three means of data collection are frequently used" (p. 134). Based on the considerations from Merriam (1998), Stake (1995), and the theoretical framework, the data were collected from interviews with teachers, students, and HoDs. This research gathered substantial data to explore the participants' perceptions, beliefs, thoughts, knowledge and thought processes. The researcher determined the research questions and collected data that would help answer the selected questions. Interviews were used for data collection.

Interviewing is helpful for participants to speak on their behalf and is a necessary part of qualitative research methods. Participants' opportunity to express themselves from their perspective allows the researcher to disclose further information about their experiences. Interviews also help clarify pre-suppositions on the researcher's part from the data collected and analysed early in the study. Furthermore, the study's validity is strengthened through dialogical data as multiple contexts within which the participants' viewpoints are articulated. Semi-structure interviews were designed to facilitate the emic perspective of the participants in the study. As was expected with case study research, questions changed over time as the researcher and participant's relationship grew in understanding (Rebolj, 2013). Interviews were conducted, which ranged between 30 to 50 minutes in length. Interviews were conducted through telephone and online conferencing platforms.

Semi-Structured Interviews are a widely used research instrument in the case study method. It provides in-depth insights into participants' experiences, views, and opinions. Structured interviews have a predetermined set of questions, and there is no specific boundary of queries for unstructured interviews. In contrast to this, semi-structured interviews provide a flexible and adaptable approach to data collection. In a semi-structured interview, the researcher provides questions. However, still, there is a margin for the interviewee to teleporter their responses or may provide additional information. According to Seidman (2013), Semi-structured interviews help to gain in-depth knowledge of participants' perspectives. Semi-structured interviews allow the collection of rich data with absolute control over the direction of the interview. Predetermined questions and guidelines help the researcher and participants to remain focused on the key objectives of the research. Parallel to guidelines, the Semi-structured interview method gives room for follow-up questions and encourages participants to elaborate on their responses. This approach often leads to collecting detailed and nuanced data that provides valuable insights into the subject under investigation (Rubin & Rubin, 2012). The flexibility of semi-structured interviews is valuable in qualitative research, allowing for a more organic and responsive approach to data collection (Rubin & Rubin, 2012).

The current scenario of art and design education provides a feasible environment for semi-structured interviews. The mechanism for formal training in art and design higher education need improvement in Pakistan. So unstructured interviews may provide unfocused and obscure data (Monday, 2020). On

the other hand, a semi-structured interview allows for an in-depth exploration of participants' perspectives, experiences, and pedagogical approaches, which can provide valuable insights into the current scenario of higher education in art and design. Semi-structured interviews balance flexibility and structure, making them particularly suitable for this research. The study aimed to explore the subjective experiences of teachers, heads of departments, and students regarding the influence of video reflective practice on creativity in textile design. Semi-structured interviews were the appropriate method for exploring these experiences in detail, as they allowed for collecting rich and nuanced data (DeJonckheere, Vaughn, 2019).

The protocol serves as a guide to keep the conversation from deviating from the topic of discussion. After the literature review, the interview protocol was constructed to ensure that interview questions were relevant and meaningful to the participants' experiences. The interview protocols, participation information sheet, consent form, and other related documents were sent to the participants through email before the interview's formal commencement. Recording options in an android or windows application were used to collect data during participant interviews. Digital recordings accurately represented what was being said during the interviews. It also allows one to concentrate on the conversations and then later transcribe verbatim speech and examine and inspect the transcriptions of the speech acts for emerging themes. The researcher emulated Seidman's three-interview series (2013) recommended for the teacher participant interviews.

Questions with participants were aligned with the objectives of the present study. A literature review about creativity, digital reflective practice, and textile design education guided the formulation of the questionnaire from three different categories of participants. This review allowed gaining a comprehensive understanding of the existing knowledge in the field, which informed the development of the interview questions. Drawing from the insights gained from the literature review, I sought a professor's expertise (Olson, 2010) with extensive experience in textile design practice and pedagogy and serving as a Head of Department in a public sector university. This expert review provided a valuable perspective to ensure the interview questions were relevant, comprehensive, and aligned with the research objectives. While formulating the questions, I focused on capturing participants' understanding and experiences related to creativity, digital reflective practice, and the impact on textile design students. The questions may have explored participants' definitions and perceptions of creativity, their knowledge and experiences with digital reflective practice, the process of creativity in textile design studio practice, challenges associated with integrating digital reflective practice, and potential opportunities and future directions in the field.

The first stage comprised of the initial questions asked the participant teachers to share their understanding of creativity and DRP and define it. The responses indicated that each had a unique perspective of creativity and DRP, employing various words such as unique, new, and different. Asking these questions helped situate the participants relative to their views and inform and contextualise subsequent discussion. Responses to this question raised deeper analyses of what factors participants considered creative and included in the more extensive questions. This phase of questions asked participant teachers who, in their opinion, decided what was creative and how creativity happens or what the creative process started to tease out the components of this process and their knowledge about DRP before and after the participation of students in DRP incorporated studio assignment.

The second stage comprised the relationship of DRP with creativity during textile design studio practice. It included stimuli such as an idea, thought, or picture that began or sparked the process. Participants then spoke of moving from here to draw, others to researching or brainstorming, but generally gathering other ideas and then developing them was a typical response. The third stage aimed to have the participant teachers consider and discuss the challenges associated with DRP and textile design studio practice. This phase also discussed the possibilities and opportunities related to the effective use of DRP in future assignments and textile design practice. The third stage included

interviews with HoDs and teachers about their experience of DRP and other queries directed towards the present study's research questions.

Two teachers from each case were interviewed three times during the study. The first interview was conducted during the studio assignment's planning phase, and the second was in the middle of the student's assignment. The third interview was held after the completion of the assignment. Same teachers were interviewed three times in different stages of the assignment. In total, *thirty-nine interviews* were conducted, including *twenty-four* from eight teachers, *Eleven* interviews with eleven students, and *four* with four heads of departments (HoDs).

Table 1: Data summary of four cases

	No of Teachers Interviewed- *(three times each)*	No of Students interviewed	No of Heads of Dept (HoD) interviewed
Case study 1	2	3	1
Case study 2	2	2	1
Case study 3	2	3	1
Case study 4	2	3	1
Total Participants	**8**	**11**	**4**
Total Interviews	**24**	**11**	**4**

3.9. The disadvantages of interview-driven data gathering

Besides the strength of the interview method in the case study, there are some disadvantages of data collected through the interview method.

The lack of implicit standardisation in a semi-structured interview inevitably raises concerns about reliability and repeatability. A further disadvantage is that interviewing is time-consuming. If the interview duration is too short, the value of the technique and the data gathered is seriously undermined. However, over an hour of interview length will burden busy interviewees and could reduce the number of people willing to participate. Also, interviewing is time-consuming regarding the organisation of interviews, transcription, and analysis. Aware of these disadvantages, the study was organised to minimise their negative impact. Thomas (2016) pointed out that memory itself is not a full blown representation of an objective reality retrieved from some storehouse but is an active construction of a story in a particular way. Constructing memory from isolated associations, recognitions, and recollections shapes, omits, distorts, and reorganises a memory to fit changing contexts. Given these concerns, the researcher must be seen as an active partner with the study participants.

Several strategies were employed in this study to address the challenges associated with the disadvantages of the interview method. Standardization and reliability were maintained by using a consistent interview guide with standardized questions and prompts to maintain consistency across interviews. Additionally, clear instructions to the interviewers were provided about the desired

approach and emphasized the importance of following the same procedure for each participant. Recognizing that interviewing can be time-consuming, interviews were carefully planned and aimed for an optimal length that allowed for in-depth exploration of the research topic while minimizing participant burden (Monday, 2020). Data saturation is a practical approach to overcome the disadvantages of qualitative research. In this study, data saturation was employed to ensure the reliability, credibility, and comprehensiveness of our findings. By interviewing individuals from different levels of education, including teachers, heads of departments, and students, we aimed to capture diverse perspectives and experiences related to our research topic. By interviewing individuals with varying roles and positions within the education system, a comprehensive range of insights and understandings were gathered, and a multi-level approach allowed for exploring the research topic from multiple angles and gaining a holistic understanding of the issues at hand (Rubin, & Rubin, 2012).

All the interviews were conducted online in one-to-one settings. One notable advantage of online interviews is their convenience. However, online interviews also come with their share of challenges. Technical issues can be a significant hurdle, including internet connectivity problems, audio or video disruptions, and software compatibility issues, which may interfere with the smooth flow of the interview and data collection. Building rapport and establishing a comfortable atmosphere can be more challenging in an online setting, as the absence of physical presence may create a sense of distance that requires extra effort to overcome (Oliffe, Kelly, Gonzalez Montaner, Yu Ko, 2021). Despite these challenges, online interviews have become increasingly popular, especially when in-person interviews are not feasible or practical. I reduced the challenges of online interviewing by communicating with my participants about technical preparedness, like audio and internet connectivity. This included sharing guidelines on internet connectivity, recommended equipment, and troubleshooting steps. In some cases, alternative methods were used, like phones. To avoid Non-verbal cues and rapport-building, I tried to maintain a friendly and engaging tone, actively listen, and encourage participants to express themselves fully (Salmons, 2012).

3.10. Data Analysis

Given that the chosen theoretical framework was constructivist-interpretivist, the researcher spent extensive time constructing multiple interpretations from large amounts of data collected via interviews. Following the theoretical stance, this research investigated different ways to view the data in more detail to determine if there were common ideas and inconsistencies among and across the examined cases. Both Merriam (1998) and Stake (1995) believe that data should be interpreted from the moment data collection begins, and this study followed this notion. However, not all data analysis techniques followed Stake (1995) and Merriam (1998) due to other data analysis techniques being more suitable for the theoretical framework.

After interviewing, video & audio recordings were transcribed. For the present project, interview transcripts were generated for each participant, and although respondents were offered the option to receive a copy of their interview transcript, none of them requested it. Afterwards, recordings were replayed to verify or correct errors in the transcription. Playing the recordings several times has been recommended for the researcher to become immersed in the data (Kostereliogl u, 2016). The audio/video recording of interviews was reviewed, transcribed, read, and identified key themes. Specific statements were identified related to the phenomenon of DRP and its influence on undergraduate students' creativity, separating relevant and irrelevant information during all the interviews. Applicable information included specific statements about digital reflective practice, creativity, and factors that could relate to DRP.

Manual Coding was used to analyse and interpret the data. Divergent perspectives of the participants were examined, and composites were constructed for an overall textural and structural description of

the phenomenon as the textile design teachers experienced it (a phenomenal analysis of the data). Categories were reviewed, and patterns were identified. Data were integrated and summarised for the reader. Descriptions of the relationships among the categories were offered. Finally, it provided a composite description of the meanings and essences of the experience of digital reflective practice during student teaching in textile design and its relationship with the student's creativity.

One less frequently utilized technique was "overreading", presented by Poirier and Ayres (1997). According to Ayres, Kavanaugh, and Knafl (2003), "overreading is a within-case analytic strategy by which the researcher looks for meaning that is implicit rather than explicit in the interview text" (p.867). Poirier and Ayres (1997) discussed the need for this process, given the complications of analysing the experiences of human beings, which are dynamic and ever-changing. According to Poirier and Ayres (1997), "as inconsistency is a part of human nature, so it will be in the stories humans tell" (p. 552). This method allowed the researcher to construct different avenues of interpretation during the data analysis.

Another data analysis technique employed in this study to analyze cross-case information was hermeneutic spiralling (Tesch, 1990). In hermeneutic spiralling, “the analyst moves back and forth between individual elements of the text and the whole text in many cycles” (Tesch, 1990, p. 68). This method provided a means for identifying commonalities and incongruences within and across cases. Both techniques described above, overreading and hermeneutic spiralling, connect well with narrative inquiry (Ayres, Kavanaugh, & Knafl, 2003) but work within this research context, given the aim of the analysis was to find interpretive descriptions of common ideas and inconsistencies.

The present research utilized Stake’s (1995) method of categorical aggregation to analyse and interpret the interview content. According to Stake (1995), “both categorical aggregation and direct interpretation depend greatly on the search for patterns” (p. 78). In the most current sense, Stake (1995) referred to thematic analysis, which was the process utilized for the analysis of the interviews and with the reflection journals and document analysis. To closely adhere to the ontological assumption of the theoretical framework, the researcher sought multiple themes, interpretations, and interpretive descriptions without coming to one truth about the topic. Stake (2005) sees interpretation as continuous throughout both data collection and interpretations, then goes on to say, “an observation is interpreted against one issue, perspective, or utility, then interpreted against others” (p. 450).

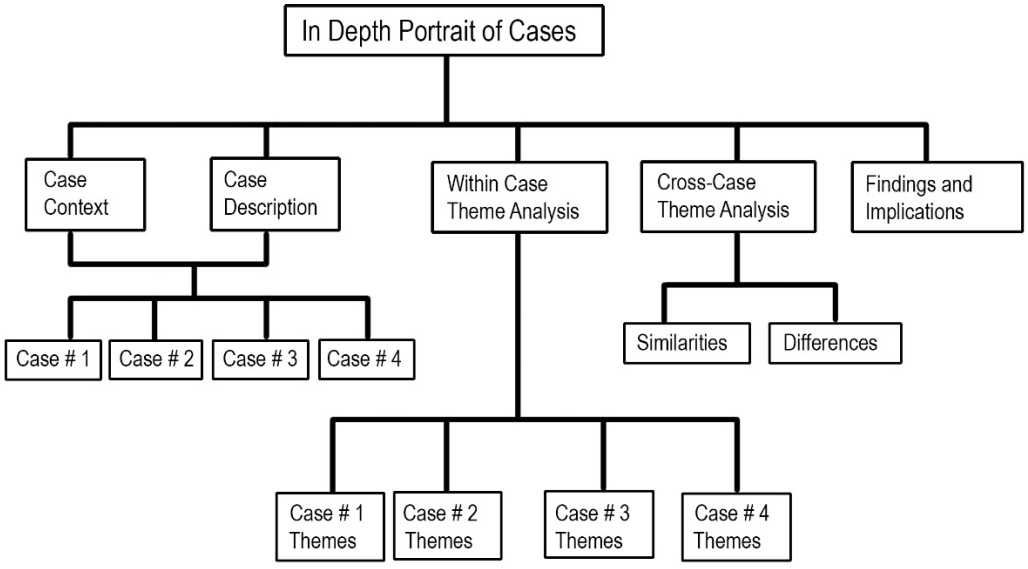

Figure 4: Adapted Structure for coding a multiple case study (Creswell, 2013, p. 209)

Stake (2006) outlined several strategies to conduct cumulative multiple case study analyses. He identified themes as "central ideas related to its situation" and factors as "a widely found, sometimes influential variable of interest well beyond its situation." Stake, 2006, p. 64.) His overall strategy is to identify, sort, and rank themes and factors of relative importance leading to clusters of ideas that can be treated as assertions that may apply to the cases (Stake, 2006). A multiple case study was proposed to understand the diversity of experiences, ideas better, and beliefs manifest in textile design students to assist with the analytic task of identifying patterns across the data based on thematic and descriptive coding. The juxtaposition of stories from these four institutions was designed to be more illuminating than what might have been learned in a single case study.

Each case was analysed before cross-case analysis. Stake (2006) outlined the priorities of the investigator in a multiple-case cross-case analysis. First, to understand each case by answering the question, "How do we understand this case?"; and second, to understand the cases to each other by answering the question, "How do we understand the quintain?" (p. 11). Before conducting a rigorous, systematic analysis process, all data sources were read to "obtain a general sense of the information and to reflect on its overall meaning" (Creswell, 2013, p. 185). A cross-case analysis was begun after data from all individual cases were analysed and summarised in case study reports. The guidelines of Stake (2006) followed the "Track II" (p. 58) cross-case procedure, which focuses on the connections between cases and moving toward generalisation rather than "preserving the situationally" of individual cases (p. 58). At the same time, findings were attended to in each case:

- All case study reports were read.
- Recorded and grouped individual case findings into two categories and merged findings based on similarities and notable findings based on their differences. The relationship between the merged findings and initial themes was considered, and developed tentative assertions based on the merged results. The evidence and individual case findings also contributed to developing each tentative assertion to best support the final assertions.
- Assertions were synthesised and generalised to produce theme-based assertions as answers to research questions.

Qualitative data analysis generally involves coding and identifying categories and themes (Bengtsson, 2016; Clarke & Braun, 2014). For example, in thematic analysis, researchers employ a descriptive analysis that emerges in identifying themes. Clarke and Braun (2014) viewed thematic analysis as a foundational method for qualitative analysis. They defined *thematic analysis* as “a method for identifying, analysing and reporting patterns (themes) within data” (p. 79). They considered “flexibility” to be one of the benefits of thematic analysis. Because of such flexibility, I used thematic analysis to interpret daily debriefing, observation, and interview data. I used inductive thematic analysis because it allowed me to make inferences without establishing a pre-existing coding scheme.

Several techniques were employed in the present study to develop the findings. But ultimately, the researcher wanted to identify some major themes within each case based on the analysis of three data sources (interviews with teachers, HoDs and students). Moreover, the researcher found several major themes across all four cases or at least two of the three cases. To find “something important about the data in relation to the research questions and represents some level of patterned response or meaning within the data set” (Clarke & Braun, 2014, p. 82). Each participant turned in a separate document to be analysed, and meaningful data was collected from interviews. According to Clarke and Braun (2014), “any research doing TA [thematic analysis] needs to actively make a series of choices as to what form of TA they are using and to understand and explain why they are using this particular form’ (p. 58). Therefore, the researcher chose to find themes that portrayed the participants’ experiences with open-ended questioning and how they developed constructs from their perceptions and beliefs about the creation of open-ended questioning for instructional purposes. Once the major themes were established, the researcher began interpretations and discussions of those central

themes. It is essential to understand this research process collectively, and a summary is provided below for the process in its totality.

Trustworthiness

For this study, I considered internal validity and reliability as trustworthiness. The use of triangulation, member checking, debriefing, and clarification of research bias (Anfara, Brown, & Mangione, 2002; Woods, 2005; Yin, 2014), as well as extended observation (Pole & Morrison, 2003; Woods, 2005), maintained to ensure the internal validity of the analysis process. For example, multiple interviews were conducted with different categories of participants. These multiple sources helped to establish the triangulation of the findings (Denzin & Lincoln, 2011; Woods, 2005). Furthermore, for pre-and-post interviews, I performed member checks with the participant teachers to ensure that I had correctly transcribed the interviews and that the emerging themes from the interview data could connect back to the ideas participant expressed. A systematic audit trail was created to describe the data collection and analysis methods for ensuring reliability (Pole & Morrison, 2003; Yin, 2014). According to Yin (2018), case study tactics allow a researcher to maintain construct validity by integrating multiple sources of evidence and having key participants review draft case study reports.

3.11. Ethics

This study received approval from the Liverpool Online Research Ethics Committee. VPREC Ethical Approval (July 15) is attached in the appendices. The interview guide and Participant consent forms for teachers, HoDs, and students are attached in the appendices section.

The present study engaged four departments of different higher education institutions in Pakistan. Formal approvals were taken before data collection. The researcher followed proper procedures directed by the Liverpool Online Research Ethics Committee. Participation in the study was voluntary, and it was communicated to all the participants during the initial phase of data collection. The researcher obtained informed consent before participating in the research and observed ethical principles. As interviews were conducted online, google forms were used for consent. The consent forms provided complete information about the research's title, key objective, and nature. Participants could withdraw from participation at any time. The researcher was the solemn data collector, and no assistance or help was taken from any human resource. The researcher coded all research participants completed designs with a participant number before forwarding the completed designs to the evaluators for review. The researcher maintained all participants' work on a personal computer in a safe place for storage.

As mentioned before, the current study was conducted in an online setting. All the interviews were conducted online. At the time of the data collection, many universities used online tools because of Covid 19 restrictions. And lockdown. But still, it was an experience that many teachers and even students needed to be more comfortable with online education and explore other technological tolls during data collection (Bughio, Abro, & Rashdi, 2014). Secondly, internet connectivity and the outage of electricity were other issues in online interaction. Different online tools were used for online communication considering the comfort and availability of the participants. Sometimes I needed to reschedule the interview because of internet connectivity or power out.

Participants were performing other duties. Some teachers and HoDs were engaged in official duties. Executing the data collection without discomforting them from their jobs was another challenge. I always considered the availability of the participants according to their ease. Interaction with the teachers is more frequent than with the HoDs and students. Keeping them motivated during the research was also a challenge. I was always available for them to address queries about aims, objectives, or any other implementation of research. It was experienced that clarity of concepts and

prompt feedback play an essential role in participants' motivation. Consciousness and vigilance were observed in discussing the existing pedagogy of their intuition and the proposed activity of the present research. It was observed that some of the ideas contradicted the institution's ideology or policies, and they were reluctant to be open about critical concepts. In this situation, anonymity and confidentiality were critical factors for the institution's and teachers' involvement. Assurance of anonymity and confidentiality were provided in different stages of the research.

'Confidentiality, anonymity, legality, professionalism, and participation' are common ethical issues in applying qualitative research discussed by Blaxter, Hughes and Tight (2006, p.160). But there were specific challenges associated with the present research. Every university has its own rules, regulations, and marketing strategies. There were many aspects that universities wanted to keep private. After defining specific parameters, I emailed my approved proposal to Pakistan's universities/art institutions with pre-defined criteria. The selection of the institution was based on the early permission to access the classroom of textile design. It was critical to abide by the code and conduct of various universities without discussing their sensitive information. It included their marketing strategy to target potential students and internal data for assessment and evaluation. The following criteria were observed to ensure the ethical considerations of the study.

- The present study was executed after formal approval of the institutions and the consent of the textile design teachers.
- The researcher did not influence any phase of the class activity: online or on-campus, including demonstration and evaluation.
- Participation in the current study did not influence teachers' performance or student grades.
- All the required datils of the research were communicated to the participants, including its effects on their professions and personal life.
- The confidentiality and anonymity of the participants were observed at every phase of the research.
- The identity of institutions did not disclose in the thesis, and this was communicated to officials of the organization.
- The researcher did not influence the view of the participant at any phase.
- Using DRP in studio assignments by the students was optional and did not affect the grade of the students.

Summary of the Chapter

Chapter three discussed the qualitative case study research methods and established a multi-case study strategy and semi-structured interviews as the appropriate bases for this study's general aim to be addressed and for this study's selected research questions and conjectures to be tested. The chapter also discussed research settings, data gathering, the rationale behind selecting semi-structured, and data analysis. Afterwards, different research traditions and methods outline which methodology and strategy are appropriate for research experience. The second objective was to forward the study's theoretical propositions as conjectures and detail the rationale, methods, and procedures for multiple case studies that will allow the conjectures to be tested and for conclusions to be drawn. Multiple case research studies aimed to incorporate the views of design teachers, heads of departments/ coordinators, and students. For the study's design, it was imperative to incorporate the diverse viewpoints of these three groups and develop a sampling design with as little bias as possible. Holistic case design & interpretive multiple case studies were implemented because it was critical to gather qualitative insights from different respondents to provide more in-depth accounts.

Online interviews were used as the primary data collection instrument. Using different data collection sources, the researcher developed an understanding of the existing textile design pedagogy and how digital reflections could be incorporated into the current settings. Time limitations were observed

according to the specific location. An unbiased sampling design was practised in the present study. The recruitment effort was reasonably extensive. Among the interviewees, the criteria for inclusion required that: textile design teachers take a course in studio practice in the sixth semester and above.

Chapter 4: Results

Each case is presented individually in the context of themes mutually extracted from the cases for results. Afterwards, cross-case analysis summarises and compares the results of independent cases. For data analysis, personal viewpoints were bracketed while conducting interviews to obtain valid research data. The analysis focused on the subjects' individual experiences and their effect on creativity related to digital reflective practice in textile design education. Digital tools were scrutinised for reflection that evolved from the past, are used currently, and possibly be applied in the future. An examination of textile design education today was followed by a thorough discussion on the capabilities and limitations of digital reflective practice in art and design. The research gained answers to queries such as the students' and educators' learning goals, the design process's critical issues, the transformation in learning and teaching patterns, and students' creativity. It also probed questions surrounding the emergence of a digital technology and design environment by examining various interrelated issues in studio settings.

Collecting, grouping, and examining data and information from these cases explained how different subjects experienced the phenomenon. The opportunities were analysed, compared, and contrasted as potential issues, benefits, and concerns of digital tools for reflection in textile design education. The interviews in each case study were transcribed from audio and video recordings into text and categorised into three segments: Teacher's perspective, Head of Department (HoD) perceptive and students' perceptive. Each segment is divided into themes extracted from the interview. Interviews needed to transcribe before coding and thematic analysis (Creswell, 2013). Questions from interviews were aligned with the research questions. Five significant themes related to all four cases were extracted from the data.

- Educator's and student's Perception of DRP·
- Challenges and issues in the implementation of DRP
- Perception about Creativity
- Effect of DRP on student's creativity
- Prospects of DRP in the context of textile studio design

Above mentioned themes were sustained in all interviews and provided a foundation to answer the research questions. Central themes were further divided into sub-themes and categories. Initially, individual cases were discussed and the opinion of each respondent group (Teacher, Head of departments, and students). Five themes were elaborated on in the context of different respondent classifications. In the end, cross-case analysis (Yin, 2009) was done and presented a summary of the analysis was in a table. This chapter also contains the interviewees' personal and professional experiences and opinions regarding how digital reflective practice has influenced the textile studio course. The information is organised based on exacted themes in the light of research questions. Online interviews were conducted based on the questionnaire approved by the ethics committee. The data summary of the present study is as follows.

As mentioned before, two teachers from each case were interviewed thrice during the study. The first interview was conducted during the studio assignment's planning phase, and the second was in the middle of the student's assignment. The third interview was held after the completion of the assignment. In total, *thirty-nine interviews* were conducted, including *twenty-four* from eight teachers, *Eleven* interviews with eleven students, and *four* with four heads of departments (HoDs).

4.1. Case Study 1 (CS1)

The selected department (Case Study 1) was one of the pioneer departments of the university. Case Study 1 (CS1) awards bachelor's and master's degrees in art, textile, Jewellery design, and visual communication. Moreover, it offers interdisciplinary learning experiences. CS1 aims at prompting divergent art forms and colouration among disciplines through an affluent art environment. In addition, the institute provides a variety of channels for community outreach and co-curricular activities such as puppetry, drama club and music society. It is in Lahore, a city of significant art galleries and museums, surrounded by the textile industry and many digital imaging companies. CS1 is famous for its first-year curriculum-the foundation which trains students of all majors in basic drawing, design, and computer skills. Six participants were interviewed for case study 1. Teachers are presented as CS1T1& CS1T2, the head of the department (HoD) as CS1H and students are written as CS1S1, CS1S2, CS1S3. Following are the participant details with codes.

Table 2: Case Study 1, Participant's code

Participants	***Codes***
Case study 1 teacher 1	*CS1T1*
Case study 1 teacher 2	*CS1T2*
Case study 1 head of department	*CS1H*
Case study 1 student 1	*CS1S1*
Case study 1 student 2	*CS1S2*
Case study 1 student 3	*CS1S3*

4.1.1. Teachers' Perception About DRP (CS1)

For the present study, CS1T1 & CS1T2 taught a textile major studio & fibre revisited course comprised of textile design majors. They conducted another course called the 'design portfolio' about formerly presenting textile fashion and jewellery designers in the market. A teacher was interviewed in three phases. The first interview was conducted during the planning phase, and the second was in the middle of the assignment. The third interview was conducted after the completion of the assignment.

CS1T1 presented an opinion that she was familiar with reflective practice as she did her master's in education. CS1T1 said, *'I have been reflecting since I started; I did my master's in art education (Interview 1)*. CS1T1 discussed the significance of reflection by saying that *'whatever they are producing, the element of reflection is there*'. Furthermore, *'one cannot move forward in design without reflection without putting '(Interview1*). Additionally, CS1T2 discussed students' reflections: ' I guess they are doing some reflection already, but in the written form, so, I guess the videos are a powerful medium that *we have not thought of' (Interview).* CS1T1 & CS2T2 discussed that '*Critic*' and '*Jury*' are typical in the design process. Nevertheless, the process is based on verbal discussion, and fewer examples of written or video reflection are evident from the conventional design process. CS1T1 shared her experience that *'I spent much time reflecting on myself and then ensuring that points covered them in my teaching'* (interview 1).

CS1T1 & CS2T2 discussed some practices in their current teaching method that resemble reflective practice. As CS1T1 pointed out,' *the critical incident questionnaire is one of the prominent tools for reflection'* (interview 1). Through this questionnaire, students give feedback on the strengths and weaknesses of the coursework and how they performed, what they learned and what they could have done better. Students also provide feedback on how a teacher can serve better as an teacher. However, CS1T1 & CS2T2 pointed out that video and audio reflection will be a new experience for teachers and students.

Challenges in the implementation of DRP: teacher's perceptions

In the first interview, CS1T1 anticipated some technical issues in the process of audio & video reflection. CS1T1 pointed out that we have some limitations, such as internet connectivity and the availability of the appropriate tools. She also pointed out the attitude problem of the students. Universities have shifted to hybrid and online education models, but students and teachers should accept the format and technological tools in education. She said, *'These are behaviour character problems' and might be a hurdle in executing the present research idea'* (interview 1).

Most of the technical challenges mentioned by CS1T1 were related to the internet, uploading and downloading videos; as she said, ' *Yes, few issues like video is not uploading. Video file is heavy'* (interview 1). However, students would not face any issues in recording the video reflection. CS1T2 also pointed out in her first interview that *'I am assuming they will be compatible with the medium because of the frequent use'* (interview 1). However, the perspective of CS1T2 changed after applying the proposed research. She said in her last interview that *'the technology and training is a problem which I realised repeatedly'* (interview 3).

CS1T1 observed that one of the issues in video reflection is self-consciousness. CS1T1 experienced this issue in the past: when she asked the students to send their pictures for the record, students sent filtered pictures. It was visible from the students' behaviour that they were conscious about their looks and appearance on camera. CS1T1 discussed in the last interview that the expression of the students improved in the third/previous video reflection because they became used to the tools and medium and mentioned that *the 'third time they were used to it, so they were doing it from their own cameras'* (interview 3). CS1T2 pointed out that *'It is not that comfortable for everyone to record this reflection while videos rather than writing it or saying it out loud in a discussion'* (interview 3).CS1T2 also discussed that *'this generation is not camera shy in daily life but was reluctant to use the recording for reflection purposes* (interview 3).

One of the reasons for camera consciousness is communication skills discussed by both CS1T1 & CS1T2. Students try to communicate formally in English, which is not the native language of Pakistan. So, students might face problems in language while recording a video, as *'English is a big problem for Pakistani students'* (interview 1).CS2T2 also mentioned that '*the problem would be critically analysing the writing process or recording as artists and designers there are, they are not always very comfortable talking about their work'* (interview 3).CS1T2 discussed that there might be trust issues related to their work assignments or videos; they do not want them to be used in any other capacity. CS1T1 & CS2T2 noticed problems, such as time management. As students have much practical work for their assignments, it might be challenging to record videos continuously.

Overall, CS1T1 and CS1T2 believed this generation would adopt the medium of video reflection if we gave them a slight push. CS1T2 argued that the current scenario of an online education setting promotes video recordings, and they restrict the students from using video reflection to interact with the course/assignment.

Teachers' perceptions of creativity

Creativity is one of the essential phenomena in design education. CS1T1 said creativity is *'to tell ordinary stories in meaningful ways'* (interview 2). She used the word *'hard-hitting'* multiple times while expressing her point of view about creativity. CS1T1 related creativity with '*uniqueness and something that touches a spot'* (interview 2). Discussing creativity in textile design, CS1T1 expressed the aesthetical and narrative aspects of designs. She valued the narrative and historical side of the design. CS1T1 did not limit creativity just to industrial designing but an essential component of society's social and economic transformation. CS1T1 considered that academia should lead the textile industry in terms of creativity and innovation, and it should not be the other way around.

CS1T2 associated creativity with problem-solving & acceptance of new and innovative ideas. However, CS1T2 believed that creativity is a subjective phenomenon. For her, *'it is a space in which one can construct, deconstruct, make things, and one does not get much material into it. It is just a thought, and one can mould and n construct things in one's mind'* (interview 2). For textiles, CS1T2 acknowledged the significance of pattern making and execution of the pattern.

Teachers' perceptions of the effect of DRP on students' creativity

CS1T1 expressed that, somehow, DRP affects the creativity of the students. She quoted an example of group activity in the studio course. She said that by using digital reflection tools, students *'focus more on their weaknesses and how they cannot manage group dynamics, which makes their creativity, in general, improve*'(interview 3). CS1T1 mentioned that students were analysing things visually and verbally because of video reflection. CS1T2 discussed that *'DRP is one of the tools that can help a student go through and review those thoughts and in the form of tangible feedback, so it actually can help them have a record*'(interview 2). CS1T2 also pointed out that most communication in studio design settings is verbal. Documentation through video will be a good idea to record and review the thoughts and concepts afterwards. CS1T2 said students were more *'aware of what they are doing in that work, the entire process through digital reflective practice because their entire reflection is audible enough'* (interview 2). Furthermore, as they say, it aloud in the form of reflection, *'it was very much helping them in the form of critical thinking, and it was again penetrating their creative process'*(interview 2). CS1T1 & CS1T2 believed that concept development and task understanding are the primary stages where DRP affects the students' design process and creativity.

Teachers' perceptions of the prospects of DRP

CS1T2 showed they have time constraints to express their ideas and thoughts in traditional discussions. However, they are flexible when students are doing it through audio & video recording. They can avail themselves at any time convenient for recording and expressing their thoughts. CS1T2 also pointed out that in face-to-face discussions, typically, *'they are listening to us in most cases'* (interview 3). Nevertheless, there is a margin for students to express their opinions in this practice. CS1T2 had a point of view that *'recording and fastest way of getting their reviews and reflections or it is invisible'* (interview 1). CS1T1 anticipated that digital medium (i.e., audio & video) was different from the traditional reflective practice as digital mediums are *'more spontaneous' & 'more candid'*(interview 1).

CS1T2 suggested that *a 'set of instructions is required for effective use of DRP for the future, wholly organised'* (interview 3). CS1T2 proposed involving social media in this exercise and said, *' It can be an entire project'* (Interview 3). CS1T1 & CS1T2 agreed in the last interviews that students were comfortable using digital tools for reflection, but students need continuous motivation and guidance to remain at a certain pace. Teachers should guide them, and *'it was more about the technical instructions than the content'*(CS1T2, interview 3).

4.1.2. Head of Departments' (HoD) perception of DRP

CS1H has been in the teaching profession for about 25 years and has been heading the current department since 2004. One interview was conducted with CS1H at the end of the student's assignment with digital reflective practice (DRP). CS1H was not satisfied with the strategy of DRP in the studio assignment. CS1H mentioned that *'students are not trained or equipped to make videos'*. She gave some examples of virtual shows and her experience of involvement of digital tools in pedagogy. CS1H mentioned that *'Even in the past, fewer students do video, and the reason might be the scope of the discipline. However, realised the first time in this thesis that if the students want to explore the genre of videography, proper training will be requisite'.*

Challenges in the implementation of DRP: HoD perceptions

CS1H recommended that parallel to the technical training of videography, appropriate equipment and tools will be required for a practical digital reflection. She mentioned that *'if you lack training in videography, the output will not be sound.* The camera is technically intense, so it requires proper technical and aesthetical training (she called it the frame of the eye) before application in studio assignments. CS1H mentioned that *some students did not use video reflection for expression. Moreover, 'some of them started sitting there like newscasters in front of the camera'*. The second issue was why everybody thought we had to speak in English' and *'the language barrier created much awkwardness'*. In short, camera consciousness and language barrier were significant challenges for undergraduate textile students.

HoD perceptions of creativity

CS1H discussed the idea of creativity concerning the general concept of textile design. She discussed that most people confuse creativity with beauty. However, according to her, *'It is something new which is opposite to pleasing'*. According to CS1H, creativity uses conventional norms in a different or new way. She also negated the concept of market requirements in the design process. According to CS1H, '*creativity and innovation should trickle down from academia to the industry'.*

HoD perceptions of the effect of DRP on students' creativity

CS1H had a bilateral opinion about creativity and its relation to DRP. She said, *'there are timeframes when the video can become an asset or burden for textile students'*.CS1H discussed that too much video reflection might hinder the process of creation and productivity, so there should be a balance between reflection and practical work in textile design. CS1H proposed that reflection should not be practised at different design development stages. According to her, DRP *'enhances students' creativity, but it should be at the end'.* CS1H pointed out that *'if one asked student to reflect in the middle. They will be side-tracked or deviate'.*CS1H considered that DRP would help understand the placement of the textile design & products in the market. CS1H focused on the market strategies of designs rather than creativity in the design process.

HoD perceptions of the prospects of DRP

CS1H had a point that the English language is a barrier to the expression of the students. We should convince the students to use the local language. It will enhance their expression.CS1H considered that being free to use any language for some students would increase their confidence and impact of video reflections. CS1H pointed out another issue that relates to the cultural settings of Pakistan. Textile design studio practice involves assignments that require a skilled worker's assistance. Everyone, specifically females, is not comfortable showing their faces by any means. In this case, students will need permission.CS1H stressed that we need teachers who know textile design and the basics of video and audio recordings. Students should be taught *'by someone who understands that textiles will be injected into their mainstream work'*. She also mentioned that it should be somebody led by somebody who is broader-based and open to ideas.

4.1.3. Student's perception of DRP

CS1S1, CS1S2, and CS1S3 were students of the textile design sixth-semester program in the selected institution's textile & fibre design department. Thrice has experienced digital reflective practice (DRP) in the assignment planned during the case study. One interview was conducted with each of the student participants at the end of the activity. All of them are comfortable using mobile phones for DRP. They all foresee those digital tools have much scope in education because of the acceptance of

new technologies and social media. They all considered it a good idea because students nowadays are familiar with digital filming and videography.

Challenges in the implementation of DRP: student's perceptions

CS1S1 expressed about video reflection, '*I was more conscious. I need to prepare myself for what to say in the video and how to talk in the video'*. Consciousness can be beneficial as it needs a thought process. On the other hand, it may slow down the design process. CS1S2 argued that DRP does not slow down. It speeds it up, or if it does not speed up, it does not affect the thinking process or brainstorming. CS1S3 mentioned that at the start of the project, DRP felt a burden because we were already doing much digital work, such as *'uploading the assignment in Google Classroom'*. However, as they proceeded with one or two videos, they became comfortable with the medium.

Student's perceptions of creativity

CS1S1 said creativity is when *'we train our mind to do something different, something good'*. She admitted that creativity is all about generating new ideas; as she said, *'creativity is about combining idea generation and doing some new or innovative things'*. CS1S3 also mentioned that '*creativity is the development of ideas and thoughts*. People think in a specific direction, so creativity is thinking out of the box.CS1S2 related creativity with expressing ideas and using a medium to express any concept.

Student's perceptions of the effect of DRP on students' creativity

CS1S1 discussed that *'when I was making a video and talking about my work, I had to understand better what I have learned about the assignment'*. CS1S1 pointed out that learning exists in our unconsciousness. Moreover, we noticed the things when we repeated them by some medium of expression. She said, ' *It enhances our observation as we know that we are learning things and thinking about them'*. CS1S2 also discussed a similar idea and said that expression is the common element between video recording and art & design practice. CS1S1 & CS1S2 suggested that understanding the task & concept development are the areas that could be improved with continuous use of digital tools in reflection.

Student's perceptions of the prospects of DRP

CS1S1 expressed that sometimes we are reluctant to express our thoughts face to face. Video reflection provides an opportunity to talk about inner selves. CS1S2 also pointed out that the factor of social anxiety was reduced in the video reflection process. CS1S1 says video recording is more convenient than other reflection tools, such as journal writing. CS1S2 also pointed out that recordings are the easiest because they do not require much time. Data transfer is also convenient in this way of reflection.

In contrast, CS1S3 had a point of view regarding idea generation, creativity, or out-of-the-box thinking. The brain works well when reflecting manually rather than digitally reflection. However, this was his initial idea. In the end, she also discussed that *'many students in my surrounding are convenient to explain the work verbally'*. CS1S3 further explained that they have jury and discussion sessions during and after the assignment, and many students perform well in this exercise. CS1S3 stressed the freedom of language, which was reflected in their work by any medium. It could be digital or written reflective journals. CS1S3 also shared her experiences talking in Urdu (the national language of Pakistan) in front of the camera. She said it was difficult at the beginning, but *'When I start talking, I felt that I was not talking to myself, so It became easy for me*.

4.1.4. Summary: Case Study 1

All participants (teachers, students & HoD) considered that the studio environment supports the reflective practice. Desk critique is a popular model in textile design education in Pakistan. Some students make notes of the teacher's guidelines and use them as reflective journals afterwards, but all students do not need to write reflective journals. Teachers mentioned that students do report writing at the thesis stage. However, none of the students said report writing requirements for previous assignments. They all consider mobile phones the most convenient way to record audio and video reflection. There was a difference of opinion between CS1H and other participants. Teachers and students consider that they do not need technical training if they work with their mobile phones. In contrast, CS1H thought that students and teachers require training to embed audio or video technology for reflection. CS1S1 considered that training would be needed if students used complex equipment (i.e., Digital SLR).

All the participant categories had different points of view regarding creativity. CS1T1 considered creativity as something which attains attention because of its unusual approach. CS1T2 related the idea with constructivism and de-constructivism of thoughts. Students (CS1S1, CS1S2 & CS1S3) considered creativity as something different, good, and out of the box. CS1H opposed the idea of pleasure and beauty in the outcome of the creative process. CS1H claimed that many design houses and textile brands copy the motives instead of developing innovative ideas.
The participant categories agreed that digital reflective practice helps enhance students' creativity for the following reasons.

- DRP help the students to stay focused on their work
- Recordkeeping and feedback systems improved because of digital reflections
- Enhanced observations and idea generation

4.2. Case Study 2(CS2)

Case study 2 was the department of the university. With the added advantage of cross-disciplinary study, the department offers various approaches in painting, printmaking, sculpture/installation (wood, metal, ceramics, mixed media), video art, performance art, and interactive digital art. Case Study 2 was one of the prominent departments of the university. It offers the oldest academic program in textile design in the country. Six participants were interviewed for case study 2. Teachers are presented as CS2T1& CS2T2, and the head of the department (HoD) is coded as CS2H. Three students are coded as CS2S1, CS2S2, and CS2S3. Following are the participant details with codes.

Table 3: Case Study 2, Participant's code

Participants	***Codes***
Case study 2 teacher 1	*CS2T1*
Case study 2 teacher 2	*CS2T2*
Case study 2 head of department	*CS2H*
Case study 2 student 1	*CS2S1*
Case study 2 student 2	*CS2S2*
Case study 2 student 3	*CS2S3*

4.2.1. Teachers' Perception About DRP(CS2)

CS2T1 & CS2T2 agreed on the format of the application of DRP in the current course, which included three videos. However, they allowed students to make multiple attempts before submitting the final

video, and they could use editing software to improve the quality of the video. CS2T1 considered digital tools an opportunity for educators as he said, 'We are in the *digital time zone. The practice of reading and writing is fading out'* (interview 1). Both believe that studio practice provides a conducive reflection and reflective practice environment. They follow the desk critique model in studio courses which involve weekly student-teacher interaction. CS2T1 said that teachers ' *identify students' design opportunities and obstacles, strengths and weaknesses and then give suggestions'* (CS2T1 Interview 2). CS2T1 & CS2T2 discussed that mobile phone is the most accessible tool for students. Both do not follow any reflective practice model, and this is the first time they are conducting a research activity during their course. CS2T1 considered that '*education becomes more impactful if we integrate our tools with typical day-to-day activities of students'* (interview1). He thought video and audio recordings had become essential to today's generation. Educators and students are used to visuals by putting them on different social media platforms, for example, Instagram and Facebook.

Challenges in the implementation of DRP: teacher's perceptions

CS2T1 was confident that students could handle the technicalities of digital reflective practice as today's generation makes videos and uploads daily. Furthermore, students *'can immediately access Google or YouTube'*(interview 1). On the other hand, CS2T2 presented an argument that *'there might be some problem implementing digital tools in our software* (interview 1).CS2T2 believed that fear of technology could only be handled if universities impose technology courses on students. One of the challenges discussed by CS2T1 is that *'people are camera shy. When you are recording it, anybody can access it. It is different. Alternatively, you are speaking in public, and it is different. So, people have their reservations (*Interview 1). Additionally, *'We have different social fabric'* (CS2T1, Interview 3). People from certain social classes in Pakistan have a phobia of communicating in English.

Teachers' perceptions of creativity

CS2T1 considered creativity one of the critical aspects of art and design education, but there needs to be a solid definition of creativity. CS2T2 also said that' *creativity is different for different people. Everyone has its observation and experience'* (interview 2). Novelty is considered to be the essential trait of creativity discussed by CS2T1. CS2T2 also emphasized the originality of the work. CS2T1 related creativity with the idea of fusion. He said, *'creativity is basically bringing the north pole and the south pole together at one place and making sense out of it'* (interview 2). He further elaborated that 'besides *the new thing, creativity includes modifications and improvisations'* (interview 2). CS2T1 emphasized the evolution of the design process. Transformation is an outcome of the development that distinguishes creativity from *'rearranging things'* (CS2T1, interview 2). CS2T2 also associated this phenomenon of creativity with evolution in nature. However, he added the aspect of *'problem-solving* (Interview 2) in his point of view. CS2T1 discussed that textile design creativity also relates to design development and metamorphosis.

Teachers' perceptions of the effect of DRP on students' creativity

CS2T1 considered creativity as the process and evolution of the process. Furthermore, he discussed creativity as a cognitive process. He said *the difference comes when your subconscious mind reflects on your conscious thoughts. Moreover, this happens when one organizes things'* (interview 2). According to CS2T1, 'reflection *enhanced organizing the information between the conscious and subconscious mind and sequenced them to understand the pattern one wants to make'* (interview 2).CS2T1 believed that the process or digging of our thoughts boasted when we spoke to ourselves. According to CS2T2, digital reflection might influence self-expression, but the *'textile design is not about self-expression'* (interview 2). Afterwards, CS2T2 realized that training students to reflect on problem-solving might be beneficial.

Teachers' perceptions of the prospects of DRP

CS2T1 pointed out that the digital medium is quick compared to the *'lengthy process of reading and writing'*(interview 1). CS2T1 considered that the use of digital tools increased during the COVID-19 time after March 2021. However, now, digital platforms have left indelible marks on education. CS2T2 also pointed out that *'there is a difference between expression through writing and talking. When we talk, we express the thoughts effectively'*(interview 1).

CS2T1 discussed that he valued the social media handles. According to CS2T1, we used to capture visuals and video on social media platforms, and it helped us document and understands our thoughts.CS2T2 discussed that some students feel comfortable in writing. '*Some students feel comfortable in spoken'* (interview 3). CS2T2 discussed that effectivity of DRP depends on the attitude of the students. CS2T1 discussed the idea of improvement from the teacher's perspective. He said the *'teacher's role is to keep things on track or channelize the things'*(interview 1). He argued that the digital reflective practice of the students could be better if teachers channel the way of doing the reflection. CS2T2 had a point of view that digital reflection affects students' creativity, but he argued that reflection in action hurdles the creative process of textile design students. According to him, reflection-on-action is an appropriate method for designers.

CS2T2 pointed out another benefit of DRP, particularly in online education. He experienced a time constraint in student-teacher interaction during an online class. Moreover, *'Some students are hesitant to discuss ideas in front of the whole class, so individual reflection is a good idea for many students to express their thoughts freely* (interview 3). CS2T1 deliberated that no matter which mode of reflection we use, *'sharing is part and parcel with this idea'*(interview 3). So, if we want to enhance the impact of the DRP, we should set a precedent for sharing videos or any other medium.

4.2.2. Head of Departments' (HoD) perception of DRP

One interview was conducted with CS2H at the end of the DRP activity. CS2H believed that adding digital tools in an online education setting was easy. So, the department was fine executing the researcher's proposed project. However, if we add digital reflection to traditional studio practice, we must deliberate more on applying ideas. CS2H considered that audio and video technology training is required to benefit from digital reflective practice. Like she said, *'if we want to justify or sustain DRP, then required technical and conceptual training at some point'.*

Challenges in the implementation of DRP: HoD perceptions

CS2H pointed out that *the 'infrastructure of our computer lab and IT department is not very strong'*, so students and teachers often complain of slow internet and graphic software. So, students have to put extra effort into adopting new technology. Such editing of the videos might be a challenge for the students. CS2H pointed out that they have students from diverse backgrounds. Some of them need help communicating in English. Students will communicate in English as they do in traditional studio discussions. She said that *'to speak in English is a phobia among students so that this obsession might be enhanced in this way of expression and teaching'*. CS2H pointed out two significant challenges from the administration's perspective. One is the *'bureaucratic process of institutions, and the other is some senior faculty members'* technophobic attitude'. She showed her reservations by stating that *'it is difficult for everyone to adopt this new way of teaching. So, there may be many teachers, some senior teachers, who will oppose this idea'.*

HoD perceptions of creativity

CS2H discussed creativity as an outcome of the thinking process. According to CS2H, creativity is a subjective term. However, originality and novelty are the closest ideas or nomenclature which depict

this word. She said that *'deliberation and thinking are techniques to be creative'*. She discussed that textile design creativity is the output from any stage of product development to marketing & sales. CS2H supported her argument that creative design could be at the fabric manufacturing stage or the surface design. Sometimes, designers propose innovative ways to market the usual products. It also falls into the creativity paradox. So, a designer should have a *'holistic view of the design process from production to utilization'*. A designer can only be an expert in some domains, but dialogues between various circles allow one to remain updated on multiple parts of the textile world.

HoD perceptions of the effect of DRP on students' creativity

CS2H believed DRP helped students think and deliberate about their work and design process. CS2H suggested that digital reflective practice will affect Expression, Knowledge of material and design process. CS2H used the word *'soliloquy'* in a design process. She considered it one of the qualities of creative people, which generally means talking to oneself. She had a point of view that helped in a phase of idea generation. *'DRP is an excellent way to speak to oneself* '.

Moreover, she considered reflective practice's back-and-forth process supports creativity. *So, 'digital reflective practice might help designers document their thoughts and evolution of idea'*. She emphasized the dialogue between sectors, directly and indirectly, related to textile design. This dialogue can only be created *'if the output will come from the designer's side in the form of reflection'.*

HoD perceptions of the prospects of DRP

CS2H believed that we should make learning enjoyable if we wanted to teach any skill or knowledge. She considered that a video is a contemporary tool in education, and she can see many opportunities in this way of teaching. So, students will be interested in video reflection *'if we realize the importance of this medium'*. CS2H presented another aspect related to the technical skills of the students. She argued that *'to use any technique for daily life is different, but if we use any medium for expression, especially in art and design, we need a certain skill'*. So, it will benefit the students and even teachers if they have training in using the camera, audio recording devices and other editing software. It will enhance their expression and reflection. CS2H also suggested using social media platforms for video editing and sharing. She focused on knowledge sharing and dialogue on various levels. She believed *'social media is a fertile land to grow interaction and communication.'*

4.2.3. Student's perception of DRP

CS2S1 & CS2S2 are the students of the textile design undergraduate program in one of the selected institutes for this research. One interview was conducted with both at the end of the assignment. Both students share some concepts. Both the students were quite familiar with audio and video technology in higher education. However, they were unaware of terms such as *'reflective practice'* and *'digital reflective practice*'. CS2S1 & CS2S2 considered that the use of various modes of education during the pandemic (2020-2021) familiarised the students with digital technologies and unconventional methods of instruction. So, they did not feel any difficulty or awkwardness in using digital tools for reflection and sharing their experiences. CS2S1 had a point of view that audio and video recording did not hinder their creative process, as it is a practice student usually do in textile design education. During studio assignments, students shared their work with the course teacher, and at the end, they used to have jury sessions with an internal or external examiner.

Challenges in the implementation of DRP: student's perceptions

CS2S1 pointed out that she felt more comfortable with reading and writing than talking to the camera. So, for the people like her, it was challenging to switch from reflective journals to audio or video reflection. CS2S2 discussed that textile design is a hectic job. '*It might be difficult for many designers*

to stop during design development and record a video'. *Video reflection helps organize the thoughts, but on the other side, 'it could be a burden'.*

Student's perceptions of creativity

CS2S1 considered creativity a broad term, and many concepts fall underneath it. She said, *'creativity is just another term for the expression'*. However, if we consider creativity in textile design education, the *'functionality added to the creative process outcome'*. CS2S1 used '*bridge*' for creativity in textile design: Bridge between aesthetics and purpose. She discussed the significance of practicality in design. CS2S2 also considered creativity as '*to think differently in general, but it involves 'certain principles' like aesthetics and execution in the textile design discipline*'.

Student's perceptions of the effect of DRP on students' creativity

CS2S1 considered that reflection had an immense benefit in the creative process of the design. Such as, she said that '*I go back, remind myself of what I wanted to do, and then come back again in the present moment and pursue further on of whatever idea I choose*'. Reflective practice helps us when a designer is stuck somewhere in an idea. CS2S2 also suggested that RP helps designers be conscious about their work at different stages. She shared her personal experience and said,' *when I am making a video, I have to go through the whole process before speaking because it is a practice in which you have to be prepared that what you have actually to talk and work your main project'*. She discussed that it was helpful because it allowed us to brainstorm.

CS2S1 discussed that digital platforms were convenient for documenting information from multiple resources. Initially, CS2S2 discussed the DRP to help identify the work's loophole'. However, she had a reservation that one might involve so much expression through DRP that it overcame the idea of creation. CS2S2 supported the argument with personal experience that many fellows discuss major philosophies and concepts, but their practical work (i.e., designs, sketches, and products) could be better.

Student's perceptions of the prospects of DRP

CS2S1 considered that medium is secondary in the reflective process, and attitude towards reflection is critical in the whole process. According to her, *'cognitive response is the same either with our hands or with our medium*'. CS2S1 considered that it could share on multiple platforms when we reflect through digital tools. CS2S2 discussed that communication is a two-way process involving interaction and feedback from teachers and students. Nevertheless, the current method of DRP lacked interaction between these two ends as she said it was a *'one-way stream, so I will not call it a communication'*. CS2S1 considered that the current practice of reflection was one-sided. On the other hand, good studio teaching and learning should have cross-questioning. So reflective practice will be enhanced if there is a contribution from both sides.

CS2S2 suggested that '*resources should be provided to the students for recording and editing. It will be a motivation for the students.* Teachers should allow recording reflection as it is a different medium than usual. CS2S1 & CS2S2 have a point of view that assignments should be a plan by keeping in mind the time for reflection during and at the end of assignments.

4.2.4. Summary: Case Study 2

Most students feel comfortable using digital tools for recording and sharing their experiences. CS2S1 was the only participant who prioritized writing and reading over speaking in front of the camera. CS2T1 categorically said that reading and writing are fading out, but still, only some students feel comfortable with the traditional way of reflection. Teachers and students considered online education

a favourable environment for digital reflective practice. However, CS2H raised a point that we need more planning and deliberation to add digital reflection in traditional studio class settings. CS2T1 appreciated the idea of using daily life activities in education.

Additionally, all participants agreed that they performed some reflection on studio education. They all decided that they did not follow any model for reflective practice. They were familiar with the idea of DRP but did not use the term digital reflective practice or video reflection before commencing the proposed assignment. There was a contrasting opinion in terms of adapting technology for the students. CS2T1 considered that students are familiar with essential tools of digital technologies as they use them on social media handles. CS2T2 discussed that textile design students are technophobic compared to other disciplines. CS2H also considered that training is required for effective reflective practice. CS2H believed that the university needed to provide updated technical facilities to the students. So, students must put extra effort into learning and using new technologies in video recordings.

Novelty and originality were common aspects discussed by all the participants regarding creativity. Problem-solving is another phenomenon discussed by all the participants to some extent. CS2T1 & CS2T1 discussed that fusion is a critical aspect of creativity. CS2H also pointed out that a designer should be familiar with various domains related to textile design. Innovative products in the textile design blend different processes (i.e., printing & embroidery).CS2S1 used the word bridge for the fusion or blend. CS2S1 considered creativity to be a combination of expression and function. Contrary to this, CS2T2 believed that creativity in textile design does not relate to expression. Design is purely based on function and purpose, and it should be developed without consideration of the self-expression of a designer.

All the participants agreed that DRP affects the creativity of textile design students as it allows them to be more deliberate about their work. Digital reflection helps the students to understand studio assignments and the process of completing them. All the participants agreed that the design process in textile design is not linear, so back-and-forth movement in the design process enables designers to discover the weaknesses and strengths of design. CS2H and CS2T2 considered that there should be training for both teachers and students to use DRP effectively. CS2S1 and CS2S2 pointed out that digital reflection should be two-way, and teachers should also give feedback using this technology. CS2S1 and CS2S2 considered digital reflection from the student's side only could create frustration among students.

4.3. Case Study 3 (CS3)

Case study 3 is one of the schools of art, architecture, and design departments. Today, it is noted for its close cooperation with the industry while offering various bachelor's degrees and associate programs, such as architecture, ceramic, communication design, fine arts, multimedia, product, and textile design. Case study 3 aims at preparing students for careers as it partners with business leaders and tailors its curriculum toward industrial needs. Six participants were interviewed for case study 3. Teachers are presented as CS3T1& CS3T2. The head of the department (HoD) is coded as CS3H. Three students are written as CS3S1, CS3S2, and CS3S3. Following are the participant details with codes.

Table 4: Case Study 3, Participant's code

Participants	***Codes***
Case study 3 teacher 1	*CS3T1*
Case study 3 teacher 2	*CS3T2*
Case study 3 head of department	*CS3H*
Case study 3 student 1	*C31S1*
Case study 3 student 2	*CS3S2*
Case study 3 student 3	*CS3S3*

4.3.1. Teachers' Perception About DRP (CS3)

CS3T1 & CS3T2 mentioned that reflection and reflective practice were appropriate for textile design studio courses as CS3T1 stated, ' *I think your idea of reflection resembles the mid-jury and jury process in design education '(*interview 1). CS3T1 connected digital reflective practice with writing a daybook and suggested that new technology mediums be involved in this expression. He considered *'the time changed, and I believe that we should use the technology'* (interview 1). In their first interviews, both teachers anticipated that digital reflection would help the students be more conscious about their design process. They agreed on three video models for digital reflection. CS3T1 proposed that '90 *seconds duration is ideal for the students to express their thoughts and manage the video content '* (CS3T1, interview 3). CS3T1 & CS3T2 considered that online education settings after March 2020 created a conducive environment for using digital tools in teaching.

Challenges in the implementation of DRP: teacher's perceptions

Technical issues in audio and video reflection were the most discussed phenomenon in all the interviews of CS3T1 & CS3T2. In the initial interviews, both said they did not foresee any technology-related challenges from the student's side. However, in their last interviews, they both felt students need more technological aspects of videography. CS3T2 pointed out the issue of audio in the student's digital reflection. CS3T2 discussed that *'technically there was noise in the videos of the students. It is difficult to reduce noise in videos'*(interview 3).

'Camera shyness' was discussed throughout the interviews as one of the significant challenges for the students. CS3T2 pointed out that Pakistan's religious beliefs and cultural settings are among the reasons for camera shyness, particularly for female students. In the third interview, CS3T2 shared a different experience regarding students' behaviour towards video recording. He knew some introverted students who were not expressive in the face-to-face jury sessions. However, they did presentable and decent video reflections. CS3T1 considered *that 'social media has developed a comfort zone for this generation in a way that they are more comfortable communicating through social media platforms'*(interview 3).

Teachers' perceptions of creativity

CS3T1 considered creativity a *'fusion of ideas, material and elements'* (interview 2). CS3T1 gave preference to visual vocabulary and exposure. She pointed out that *creativity relates to existing knowledge about any concept*. CS3T1 related creativity in textile design with writing a poem. She said, ' *to write a good poem, one should have a good vocabulary of words like create a good textile design one should have adequate visual vocabulary'*(interview 2).

On the other hand, CS3T2 had a strong belief in imagination. He quoted Einstein's famous line that '*imagination is more important than knowledge* (interview 2). CS3T2 pointed out that the important concept of creativity is *'how do we report, respond, reason and relate or reconnect'*(interview 2). CS3T1

& CS3T2 shared common aspects of creativity in art and design education. It included critical thinking, the box approach, and an unconventional way of doing something.

Teachers' perceptions of the effect of DRP on students' creativity

CS3T1 emphasized the practical side of the design. So, her point of view about digital reflection was on the documentation side of the design process. CS3T1 considered that video reflection, in the beginning, was not beneficial. As the students proceed in their assignment, they have a collection of their thoughts and ideas, and when they reflect on their work and cognitive development, their minds register many points, and students can improve these points. Sharing was another aspect of digital reflective practice. *'Students can discuss with a teacher or fellow mates for improvement'* (Interview 3, CS3T1). CS3T2 related creativity with the student's imagination, and he stated that *'application of reflective practice in a studio course strengthens the imagination of the design students '* (Interview 2). CS3T2 also said that DRP *'is like a loop, and apparently, it influences creativity*' (interview 2). CS3T2 also discussed that a recap of the video reflection helps the students to understand even the complicated concepts. *'reinforcement*' and '*repetition*' is the critical aspects associated with digital reflection, as pointed out by CS3T2 in the last interview.

Teachers' perceptions of the prospects of DRP

CS3T1 & CS3T2 both believed that DRP is an effective way of learning and teaching. The involvement of digital tools in education is invulnerable and irreversible. We should adopt this way of expressing ideas and concepts soon. Both presented some ideas to improve the quality and adoption of digital video reflections. CS3T1 considered that we should not restrict the students for *'regimental audio or video reflection'*(interview 3). There should be flexibility in combining other art and presentation mediums as she said that *'I would give them the freedom to use multimedia to express their thoughts'* (interview 1). CS3T1 gave an example of PowerPoint presentations enhanced by narration.

Similarly, she also pointed out some user-friendly animation software such as *'doodly & maker'*(interview 3) to enhance the production of digital reflection. CS3T1 said that today's generation is more comfortable using Instagram, Tick Tock and Snapchat. *'We should train our teachers to use these digital platforms in pedagogy and andragogy'*(interview 3). CS3T2 shared his experience that *'many students feel reluctant to ask the teachings or express their thoughts. So, this medium can be way out for them, and they do not feel much shy in this way of expressing their thoughts'* (Interview 1).

4.3.2. Head of Departments' (HoD) perception of DRP

CS3H has been associated with the teaching profession for about 15 years. She had six years of experience as an HoD in textile design. CS3H discussed with the teachers involved in incorporating DRP in the studio assignment. CS3H was interviewed after completing the project, and CS3H was highly optimistic about using digital tools in education. She considered that the only thing required to penetrate the DRP among students is the availability of good resources. *'Which by chance this generation students have access to somehow to some gadget that they can record themselves, their videos, their audios, and reflect upon their work*'. CS3H also pointed out that studio courses are designed to involve reflection from students' and teachers' sides. She referenced the *'desk critic model'* in art and design and said, ' *Students do a weekly reflection on their work and teachers give feedback on the progression'.*

Challenges in the implementation of DRP: HoD perceptions

CS3H said that *'besides the acceptance of digital tools in daily life some issues were these, especially in the beginning'*. CS3H considered that *'Neophobia'* is always there when a new strategy or method is tried. So, at the beginning of the assignment, some students resisted. However, *'later the students were quite satisfied with the flow of their reflective practice activities'.* She also foresaw that some teachers would oppose this idea if we asked every faculty member to apply digital reflection in their course. Participant teachers were in consent before the start of the project, so they were cooperative and helpful in the whole process. Anxiety in the English language is another major issue identified by CS3H. She said that she saw some of the student's videos and felt that students use the English language imperatively.

HoD perceptions of creativity

In response to creativity, CS3H replied, ' *it is engagement intelligently where once exercise is whatever one thinks one plan'*. For CS3H, awareness of thinking and action is one of the critical aspects of creativity. According to CS3H, our actions are intelligent when we know our thoughts, leading to creative work. Another aspect that CS3H discussed was problem-solving. She pointed out that textile design is a practically oriented discipline requiring problem-solving elements. According to CS2C, *'design is the combination of art and science'*. So, a creative designer acquires the critical thinking of a fine artist and acts logically as a scientist.

HoD perceptions of the effect of DRP on students' creativity

CS3H was confident about the influence of DRP on the creativity of textile design students. She said that *'this helps the students because they became more conscious, they became more actively aware of what want to do: what the design problem is, what is the technique or materials, how the decision should be made for the selection of special material, equipment and technique in which they are going to execute the given design problem'*. CS3H mentioned that '*we need active learners rather than passive absorbers of knowledge in this age of digital change. With the application of DRP, Students will act as active learners even in the future tasks and practice field'.*

HoD perceptions of the prospects of DRP

CS3H discussed some points for the effective use of DRP in textile studio courses. The primary focus was on the sessions and training regarding DRP before its formal implementation in the studio class. She said that a *few sessions before DRP and some mock reflective practice would be helpful for the students*. Some reservations were expressed towards the strict three-step model of the current study. She said that *'design studios and the design problems are amazingly diverse*. *So, there should be flexibility in implementing digital reflection in the studio courses. Adaptability could be in the form of a selection of digital mediums and some recordings of the different stages of the design process '.* CS3H believed that *'flexibility at the beginning of the application will be more welcoming for the students'.*

4.3.3. Student's perception of DRP

CS3S1 emphasized documentation through digital reflective practice. He said that *'it is human nature that they cannot memorize everything, so we can use it afterwards if we have documentation*. CS3S2 was also inclined towards the recording of the assignment through digital tools. She said, '*I think that if we are recording our assignments and stuff like that, we will give others an idea of how we did an assignment studio assignment and how they will do it. So, it would be an idea to go through*.' CS3S2 pointed out that recording and documenting thoughts and design would benefit the later generations. She gave preference to digital media over the traditional way of reflection. CS3S1 & CS3S2 expressed that *'the mobile camera is the beneficial way to record certain things. All must do is click a button and then record whatever '.*

Challenges in the implementation of DRP: student's perceptions

For CS3S1, the major challenge was the practical work that created an obstacle in recording videos during the textile design studio assignment. CS3S1 portrayed the situation, saying, *'Sometimes we are required to submit the documentation of the assignments in design seminar*. *However, we do some assignments involving heat and fire. Our whole body is involved in this labour-oriented assignment. So, it is difficult for us to handle mobile or cameras in this situation. We used to have pictures and then submit them with assignment '.* CS3S2 had a point that *'the critical problem is time management*. She considered that '*video recording is another skill set. Most textile design students are not familiar with the requirements of this area. So, they must put extra effort and time into executing digital reflections*. CS3S2 discussed that the education settings of Pakistan are not fertile to perform experiments. When any change happens, it is usually resisted by students, teachers, and administration. CS3S2 emphasized that teachers should initiate learning techniques and tactics of DRP. Otherwise *'if they are not able to explain the assignment, then. It could be a difficult thing for the students to cope with it. Furthermore, some teachers needed help learning and adopting new technologies and advancements'.*

Student's perceptions of creativity

CS3S1 said that '*creativity is the contrast to copy-pasting in design'. We try to create some new idea, design or product which do not exist in the market '.* He related creativity with novelty and originality of thoughts.CS3S2 had a similar viewpoint as she said that *'creativity in that would be how am doing that certain thing in my way'*.

Student's perceptions of the effect of DRP on students' creativity

CS3S1 focused on documentation of the design process through digital media tools. He said, *'I can recall the ideas by looking at the video'*. CS3S1 discussed that '*it would help in memorizing the design process. Remembering the design process helped refresh the visual vocabulary that might lead to innovative designs. Continuous comparison of our design with the existing styles makes us aware of market trends '.* CS3S2 also discussed similar ideas and suggested that looking back and memorizing the design process helped be innovative in concept and execution. CS3S2 pointed out that re-watching videos would affect looking at that same thing again from a different perspective. CS3S2 focused on sharing the video and audio reflections. According to CS3S2, feedback is a critical aspect of design development. She said, '*it would affect my creativity so that I would learn more like I would be able to learn through reviews and remarks'*. CS3S1 and CS3S2 agreed that DRP help in understanding the task & concept development.

Student's perceptions of the prospects of DRP

CS3S1 proposed to involve other social media platforms during DRP. He said, ' *there are few students interested in new media and try to post their work on social media platforms and social media would create interest for the students and work with more excitement '*. CS3S2 triggered the idea of a digital repository of digital reflections. She considered that '*it would help the students to create a link between the different assignments and projects*. CS3S2 also accentuated the teacher's role in accepting DRP among the students. She said that *'a teacher needs to know what kind of things students are thinking about that particular assignment'*. Teachers should command digital tools and strategies to convince students about this new medium of expression. A teacher should create an environment where students can ask questions and give feedback. If the teachers do not make such an environment, *'they will not know what they have to explain if they are not getting certain ideas about their teaching methods '.*

4.3.4. Summary: Case Study 3

All participants considered that online education settings helped the teachers and students to indulge in the DRP in the studio assignments conveniently. There was an evolution of opinion regarding technological issues during video recordings. Initially, CS3T1 & CS3T2 did not anticipate any technical issues. However, in the last interviews, both the teachers pointed out audio and video issues in students' recordings. Camera shyness was one of the significant issues discussed by CS3T1, CS3T2 and CS3H. English was also challenging for the students as they tried to communicate in this language.

CS3T1 prioritised the existing knowledge of any concept to create a creative design. On the other side, CS3T2 considered imagination the critical aspect of creativity. CS2C discussed a midway and gave priority to both aesthetics and functionality. CS3S1 and CS3S2 discussed creativity as originality and novelty. Teachers and coordinators supported this argument. CS3T2 developed a link between reflective practice and imagination. CS3H discussed consciousness as the emerging aspect through DRP. Students were inclined towards memorising the design process by revisiting their video reflections. CS3T1 & CS3T2, and CS3H believed that there should be flexibility in applying digital tools for reflection purposes.

Nevertheless, teachers considered that DRP should formally add to the curriculum so students work with total concentration. CS3H discussed the significance of training and adaptability according to different tasks. CS3S1 and CS3S2 also addressed the training phenomenon, but they had a point that training should be for both teachers and students.

4.4. Case Study 4 (CS4)

Six participants were interviewed for case study 4. Teachers are presented as CS4T1& CS4T2. The head of the department (HoD) is coded as CS4H. Three students are written as CS4S1, CS4S2, and CS4S3. Following ate the participant details with codes.

Table 5: Case Study 4, Participant's code

Participants	***Codes***
Case study 4 teacher 1	*CS4T1*
Case study 4 teacher 2	*CS4T2*
Case study 4 head of department	*CS4H*
Case study 4 student 1	*CS4S1*
Case study 4 student 2	*CS4S2*
Case study 4 student 3	*CS4S3*

4.4.1. Teachers' Perception About DRP (CS4)

CS4T1 and CS4T2 agreed to incorporate the DRP in the *Textile Design Seminar* course. This course included researching textile designers and creating designs on different themes. CS4T1 considered that video recordings in education could benefit teachers and students. DRP would help in enhancing the presentation skills of the students. As she said, *' in Pakistan, many students lack in this practice like they do not know how to present anything they do not have presentation Background in their in their school life in the college life, they never did presentation*' (Interview 1).CS4T1 discussed both aspects of using the camera as it may enhance the presentation skills or be a challenge for camera-shy students. Overall, she was optimistic about using digital tools in education. She said that *'students should also know about this thing to keep on moving with the world to keep in touch with everything that's happening in the world'*(Interview 2). CS4T1 and CS4T2 anticipated that DSLR cameras and cell

phones are assessable tools for digital recordings.

Challenges in the implementation of DRP: teacher's perceptions

According to CS4T1, interactivity is the major challenge in video reflection. CS4T1 expressed that continuous guidance is one of the significant challenges in using video recordings. Sharing her experience of the video and online settings, she said, *'Many students do not show me their work. They think their work is wrong, but I will go there in the classroom or the studios in practice when they sit there. Even students don't want me to see their work, but I will see them individually'* (interview 3). CS4T1 agreed that *'lack of communication is one of the problems faced during the application of DRP'* (interview 1) and *that 'many students do not communicate with the teacher'* (interview 1). CS4T1 pointed out the issue of trust, mainly when female students shared their videos and photographs with male teachers. In contrast, CS4T2 did not mention this issue among female students. She shared her experience of a student who used to do a veil and said that *'she did the video, editing or video making while wearing the veil, so she does not have any problem'* (Interview 3).

CS4T1 made a relation of the current DRP activity to the school system of Pakistan. She considered Pakistan's education system *needs to train students to be critical thinkers and adapt to new technologies* (Interview 1). She said that *'I have found out many students were confused. They were not getting the idea; even they were not getting the idea exactly what they had to do this, the lack of the experience from their previous education system'* (Interview 3). CS4T1 and CS4T2 did not mention any technical issues in the application of DRP. Both were confident that every student is using smartphones, and they are aware of using various applications for recording and editing. CS4T2 indicated that students' attitude is a problem rather than a technical issue.

Teachers' perceptions of creativity

According to CS4T1, creativity is an experience explored in an art or design school. Conversely, *'Some people can explore it before the time. Before they are actually in the field or before they have experienced anything like there are a lot of self-taught artists who have been working with their different materials, different ideology, different concept'* (Interview 2). CS4T1 and CS4T2 considered creativity as the novelty and uniqueness of any idea or product. For textile design, creativity involves design elements like colour and shapes and their application to the textile material (i.e., fabric). CS4T2 considered creativity the bridge between ancient knowledge and the current situation or problem. CS4T2 thought that exposure and knowledge of any domain lead to the possibility of creative solutions and products in that area.

Teachers' perceptions of the effect of DRP on students' creativity

CS4T1 said that DRP *'is happening already in our studios. Practical studios that when they ended their assignment with the work, they had to give the presentation or the jury of their final whole work whole project'*. She also pointed out that *'after doing recording, again and again, they came to know about their mistakes'* (Interview 2). DRP helped students give different views, opportunities, and *ideas* (interview 2). CS4T1 concluded her second interview by saying that *'DRP session is helping us in making the students comfortable while talking while showing their work or while representing their work through video or audio'* (interview 2). CS4T2 discussed another aspect regarding sharing of digital reflections. Students will compare their work, and there will be a sense of competition. CS4T2 said that *'students share their experiences in open jury sessions. However, their expression and thought cannot be rewound. On the other hand, video recordings allow them to revisit their work and ideas and create their peers. I think it is helping the students get more creative because it is easy to access everything worldwide from this digital media' (Interview 1).*

CS4T2 pointed out that reflective practice could be an effective tool for designers explicitly working in the industry. According to her, '*designer should be continuously aware of the market trends and styles.*

Technological advancements are another area for a designer. *In this scenario*, *a designer will get more precise about the data collecting and which data should be used for their work'* (*interview 1).* CS4T2 gave weightage to product knowledge and exposure. She said DRP made the *'students brainstorm themselves and represent their idea before getting to the product'* (interview 3). CS4T2 also discussed the presentation skills linked with DRP as she said that students *'were learning their body language'* (interview 3).

Teachers' perceptions of the prospects of DRP

CS4T1 and CS4T2 discussed that using these gadgets, tools, and processes saved time for teachers and students. CS4T2 had a point that we should not force all the students to show their faces in video reflections. Her gesture was towards the female students mainly. She said, ' *when female students face a male teacher or male faculty, I think they will hesitate'* (interview 3). CS4T12 had a point that the notion of reflection and reflective practice should be added in early education settings like schools and higher secondary educational institutions. CS4T2 also considered that *'in the current education settings of Pakistan, it is not easy to convince students to perform an activity without assessment weightage. If we want the student's attention towards DRP, then there is a need to give weightage to the curriculum' (Interview 3).*

4.4.2. Head of Departments' (HoD) perception of DRP

CS4H is a 2009 graduate in textile design. She worked in the textile industry for about two years and then switched to academia. Since 2011, she has been associated with academia as a lecturer and design coordinator. She said that her passion for education made her stay in academia. CS4H always welcomed new technologies in education, and she convinced teachers to try DRP in their assignments. When the interview started, she needed clarification on online education and DRP. Key aims and objectives were clarified and discussed their relation to the assignment. CS4H mentioned that they were not concerned with the number of videos.

Challenges in the implementation of DRP: HoD perceptions

CS4H pointed out two challenges in the process of DRP. Shooting a video might be a problem for some students, like the technical issue of lighting and audio. She pointed out that self-shooting is an issue even among design students. '*Suppose the other person is on the camera; it is easy to manage the shooting. However, capturing oneself without help is difficult for many students. 'So, in this situation, a recording could be problematic. They are required to take assistance from their fellows '*. CS4H also said that *'our daily use devices have been advanced and there are high tech cameras and editing software in mobile. Even though some students face issues in this domain'.*

CS4H showed her concern for the students who wear the veil. She had a previous experience when students captured themselves for a video or self-Portrait. '*Firstly, the cultural & religious barrier is an issue for many female students. Secondly, a student had to interact with other male members to edit and print the photographs. So, this created uneasiness and awkwardness for some students '.* CS4H considered that location of the university or institution also matters in the acceptance of digital tools. Her university is in a rural area, so resources are limited compared to developed cities.

HoD perceptions of creativity

CS4H defined creativity as *'inner intuition'* and *'natural skills'*. CS4H said that *'to be different is a critical aspect of creativity*. In her opinion, looking at things from different perceptive is one of the major traits of creativity. She gave an example of collage work and considered that students who break the traditional concept create a more creative solution. She discussed two extreme ends of creativity; sometimes, it might '*develop through deliberation, and sometimes it is abrupt and spontaneous'*.

HoD perceptions of the effect of DRP on students' creativity

CS4H considered that '*digital reflective practice might not be helpful in the student's cognitive development but could be beneficial in the documentation of the design process*. She said, ' *In design, we did multiple assignments with multiple steps. Many times, it becomes difficult to memorize each step. So, DRP will be beneficial for the students to record their innovative techniques and experimentation. It will help in the preservation and even presentation'*.

Additionally, digital tools will enhance the mobility of the work.CS4H said, ' *you cannot carry your portfolio everywhere, but digital compilation and USB are better for communicating the data '*. CS4H emphasized understanding the task and concept development. She considered that repetition of any idea with words enhances the probability of generating new ideas. *'But it will not help much in layouts and final design'*.

HoD perceptions of the prospects of DRP

CS4H considered that '*proper training and deliberated planning enhanced the possibility of a better outcome of DRP. This training should trickle down starting from the academic administration, the teachers, and the students*. CS4H showed this reservation that our teachers are not very familiar with the approach and ethics of DRP. So, '*they should have preparatory sessions before applying DRP in the class'*. CS4H also gave preference to various software in designing and reflection. She considered that learning different tools can be helpful in the reflective process.

4.4.3. Student's perception of DRP

CS4S1, CS4S2 and CS4S3 said that they were unaware of the phenomena of DRP before the activity was triggered during the present doctoral research. However, they searched this phenomenon and found information about reflective practice and digital tools. Thrice students did not show any technical problems in applying digital tools. Mobile cameras were handy tools for recording. Students were willing to use video reflection in future projects. CS4S1, CS4S2 and CS4S2 consented that DRP had given them confidence, awareness, and a critical eye towards their process and product. CS4S1, CS4S2 and CS4S2 also agreed that sharing digital videos supported co-learning and collaboration with the teachers and peers. CS4S2 said, ' *even our videos can guide students who are not good at their work'*.

Challenges in the implementation of DRP: student's perceptions

CS4S1 did not mention any difficulty in recording the videos. CS4S2 said,' *I made trial videos before the final recording to explore different options and filters '*. CS4S3 noted that we need training if we use complicated applications and software. They did not use complex hardware and software at this stage, so they faced little difficulty. CS4S2 discussed some family and cultural restrictions. She said, '*there will not be an issue if your family gives you a comfort zone. However, it will be challenging if the family does not allow it '*. CS4S2 and CS4S3 also considered that consciousness about language, body language, and expression is another challenge in applying DRP.

Student's perceptions of creativity

CS4S1 considered that creativity is *'to create something new'*. The originality of idea and execution is the basic requirements of creativity. Creativity in textile design is different from the existing trends in the market. CS4S2 also said that *'creativity is manipulating an ordinary thing in a new way'*. CS4S2 recognized creativity as *'the matter of imagination, brainstorming and mindfulness*'. On the question of creativity in textile design, CS4S3 replied that *'deformation of elements in a way that they create some new composition is a creativity in textile design'*.

Student's perceptions of the effect of DRP on students' creativity

CS4S1 had a point that DRP helped to *'explain and elaborate our expression, mediums, tools, starting point and most importantly the concept of our work'*. CS4S1 considered that DRP helped create a relationship between our concept and material. CS4S1 said that *'video reflection helps us understand the process and the flaws'*. CS4S1 discussed that '*DRP plays a critical role in the design process; if we are stuck to some point like using a material, we can see the video reflection and trace the opportunities and flaws in the process'*. CS4S2 compared the DRP with the traditional method of studio practice. She said *that 'when I did not use video recording for reflection. There are many points that I skipped or missed from the assignment. I had to ask teachers about the deficiencies of my assignment. But when I used video reflection, I learned many points by myself then I can improve my work when proceeding*'. CS4S3 acknowledged sharing digital reflections as the critical point in the whole process. CS4S3 gave an example: ' *if I record audio or video reflection then share with my colleagues then there is a possibility that they can clarify me on some points on which I was confused or stuck* '. CS4S3 also said *'sometimes I recorded a video, and my mind was stuck at that time. But when I reviewed the video, I got no idea to improve or do any assignment'.*

Student's perceptions of the prospects of DRP

CS4S2 had a point that DRP *'should be formally introduced in design institutions. It needs more time to practice '*. CS4S3 also said that *'one assignment is not enough to apply this phenomenon and get the results*. CS4S2 & CS4S3 agreed that proper training should be for teachers and students to use this more effectively.

4.4.4. Summary: Case Study 4

It was evident from discussions with all the participants that they did not follow any reflective practice model before applying DRP in the present study. Three staged digital reflective practice models were implemented, but CS4H had a point that we should restrict the student on the number of video reflections in an assignment. All the participants agreed that DSLR cameras and cell phones are assessable tools for digital recordings. Students used cell phones for the present study. Interactivity and trust were the significant challenges, according to both teachers and coordinators (CS4H). Technological issues were related to connectivity and storage while sharing the data. Teachers and students did not express technical problems in recording videos. However, CS4H discussed that self-shooting might be an issue in the DRP.

Novelty and uniqueness are the major themes discussed by all the participants. CS4S2 agreed that creativity could be created through brainstorming and mindfulness. CS4T1 considered it as an experience or journey. In comparison, CS4H discussed creativity as an innate talent. CS4T1 and CS4T2 emphasized the combination of previous and present critical thinking. All the participants agreed that DRP positively affects the understating of the task and concept development. Revisiting the video reflection helped the students identify the strength & weaknesses of designs. CS4T1 & CS4H discussed another side of the DRP during the design process that might hurdle the creative process, and students had to stop their work to record audio or video reflection. Training and practice were the key points discussed by all the participants. CS4T1, CS4T2 and CS4H considered that DRP should be treated as compulsory to get better results.

4.6. Cross Case Analysis

This segment provided a comparative analysis of different cases. A summary table is also presented in the appendix section.

All the cases agreed that textile design studio courses' existing format supported reflective practitioners. Studio settings are different from the traditional classroom framework. Most of the textile design courses are practice oriented. Students perform various assignments and projects planned by the teachers. During design development, teachers and students interact and share their opinions about the problems and progress. Reflection is done from the teacher's and student's sides. Jury sessions from external examiners are standard in textile design education, particularly after the 6th semester. In short, studio practice courses provide fertile land for reflection in action and reflection on action. Before the present study assignment, teachers of Case Study 1 and Case Study 4 were familiar with reflection and reflective practice. Besides this scenario, the participants did not mention any reflective practice model to be applied in their studio courses.

Participants in case studies 1, 2, and 3 had positive feedback about integrating digital tools in education, as most universities were online from March 2020 due to pandemics. So, participants believed that they and students were familiar with many digital tools used in learning management systems. Participants in case studies 1,2, and 3 had a neutral opinion about the online education setting. CS4T1 showed her concerns about current online education settings. She opposed online education in art and design and said that it adversely affected students' creativity.

It was acknowledged in accounts across all four cases (except CS2T2) that there were no technical issues or challenges in the digital video reflective process. Most of the students used their mobile phone cameras for recordings. Students were familiar with these tools because of their daily life and digital socializing. CS2T2 was the only teacher who considered that students faced issues in technological adaptation. The two major issues identified by all the cases were self-consciousness and camera shyness. After watching their video reflections, communication in English and social restriction for female students are two significant apprehensions discussed by teachers. At the end of the study, all the participants agreed that we (teachers & students) need training on digital reflections' conceptual and technical side, especially if we want to add this to the art and design curriculum.

Teachers discussed a few unique themes in the category of challenges and issues in DRP. CS1T2 mentioned time management as one of the major problems during the textile design process. CS2T1 pointed out the students with special needs (i.e., autism and hearing impairment). His institution had a quota of these students, and they need proper attention, particularly if we intend to apply DRP. CS3T2 shared a unique experience of students' video reflections. Some of the introverted and shy students did good reflections. CS3T2 pointed out that talking in front of the camera or recorder is a different skill. CS4T1 made relations of the current attitude of the students with their early and secondary education. CS4T1 criticized Pakistan's education system, which prevents the students from being critical thinkers and acceptors of different techniques in teaching.

Heads of Departments (HoDs) agreed with teachers' perceptions about design studio education and its cohesiveness with reflective practice models. They had an alliance on the desk critic model recognized in many textile design studio courses. HoDs' views about training also resembled teachers of all cases. They all emphasized workshops and guidance before the formal execution of DRP in art and design education. However, their point of view was hard-lined compared to teachers and students. CS1H considered that implementing DRP with proper training could have been more productive for students. CS1H was not satisfied by the strategy of DRP implemented in the current study.

Besides lack of training, lack of infrastructure, and unavailability of digital tools were some of the challenges discussed by heads of departments. The English language was also considered a hurdle in the expression of the students. Similarly, female students' camera shyness and cultural restrictions were also discussed, supporting the teacher's opinion. Two themes extracted from the Hods interviews differed from faculty members and students. CS2H mentioned the bureaucratic system of public sector universities in Pakistan. As an HoD, she felt that she had to go through channels of approval before implementing an idea. CS3H was also associated with a public sector university and mentioned similar reservations. She predicted that Some of the senior faculty members would oppose the idea of DRP because they did not want to leave their comfort zone. University administration can only impose a few things because senior faculty is part of the constitutional process. CS2H also pointed out the technophobic attitude of some senior faculty. CS1H did not discuss this issue. It is a concern that CS1H belonged to a private higher education institution. Besides the administrative status, CS4H considered that university location also matters in accepting digital tools. The university's location in Case study 3 differed from the other 3 cases, and their teachers mentioned this difference.

All the students welcomed the use of digital tools in education. They considered that cell phones were the handiest tool for recording and documentation. The student's point of view was close to the teacher's perspective. They acknowledged the use of social media and did not show any technical problems in digital recordings. Such as teachers and HoDs also considered that existing studio education provides scope for reflection. Most of the challenges discussed by the students reinforced the teacher's argument about DRP. It included time management, basic training in digital SLR cameras, family/cultural restrictions for female students, and communication in English. CS1T2 discussed a critical point about the education system in art and design. She discussed that the Pakistani Art and Design education system gives maximum weightage to manual work. She said we must learn digital tools, but they used to be for production and not creation. She said the education system supports creativity in manual designing rather than with digital tools such as Photoshop. So, this mindset of the teachers resisted indulgence in digital tools.

Following are the opinion of participants of four cases about the major categories that lead to answers to research questions.

4.6.1. Perceptions of Creativity

All the teachers of the four cases presented many common themes regarding creativity. The major themes emerging from teachers' interviews were uniqueness, novelty, and fusion. Different teachers discussed different ways to achieve this. Problem-solving, critical thinking, idea generation, and imagination were discussed as salient features of creativity. The evolution of the design process was a theme mentioned by CS2T2. CS3T2 deliberated a similar concept: creativity relates to reporting, responding, reasoning, relation, and reconnecting. Exposure to any domain also affects creativity, as to CS4T2. CS4T1 discussed the different aspects of learning creativity. She argued that creativity is an inborn skill or can be developed through learning. All of the teacher participants should have clarified this side of creativity. CS2T1 also indicated this point, mentioning that there is no solid definition of creativity, and just like any skill, creativity does vary from person to person.

The perception of creativity is very much like the teacher's ideas. Originality, uniqueness, and novelty were the persistent themes in all the interviews. Additionally, problem-solving was one of the significant creativity traits attained through different schemes. CS1H presented the idea of fusion (like the teacher's point) by unconventionally using conventional norms. CS3H also supported this idea by explaining that creativity could be achieved through deliberation and spontaneous actions. An argument about 'learning creativity' and the subjective nature of creativity was also seen in cases two,

three and four. CS4H pointed out creativity results from 'inner intuition' and 'natural skills. CS3H mentioned that creativity is an inborn talent nurtured by mentorship and environment.

Creativity in textile design relates to industrial design. By some means, all the cases discussed industrial requirements and boundaries for practical design. In cases two, three and four, participants considered that a good designer understands these industrial and production perimeters. In contrast, CS1H presented a viewpoint that parameters of creativity should be trickle-down from academia to industry and not vice versa. On the effect of DRP on the students' creativity, HoDs were clustered into two opposite views. CS1H and CS4H anticipated that the current digital reflection method could burden the student and slow down the design development process. CS4H considered that creativity is nurtured in a relaxed and hassle-free environment. It might become a burden rather than an asset if we ask the students to record their thoughts during their design development.

Originality, uniqueness, novelty, fusion, reasoning, relation, reconnection, problem-solving, and understanding of industrial and production perimeters (for textiles) were the persistent themes for creativity in four cases. The effect of DRP on students' creativity is mainly discussed surrounding these ideas.

4.6.2. Effect of DRP on Student's Creativity

All the faculty members agreed that DRP affected the creativity of students. Teachers pointed out that DRP enhanced students' awareness of the design process. The back & forth process of reflection helped the students analyse and re-analyse their progression. Reinforcement through repetition, confidence and presentation skills was another case discussed by teachers about DRP. CS2H and CS3H experienced a positive relationship between DRP and creativity as it enhanced the expression, consciousness, and student-teacher knowledge transformation. Although CS4H was not in favour of the presented model, she also discussed that repetition of any idea with words might enhance the probability of generating some new ideas. CS2H introduced the concept of Soliloquy. She discussed that ideas develop when one talks to oneself with words. Moreover, this is the essential practice of digital reflections. CS2H also deliberated that back and forth thought process enhanced the possibility of innovative idea generation.

A few themes were not directly related to creativity but could benefit learning management. CSC3 and CSC4 discussed digital documentation as the benefit of DRP, which could enhance the mobility of students' work. CS2H reinforced the idea of one of her teachers (CS2T1) that DRP might develop a check system for the university administration and teachers. Sharing digital reflection would promote the open-door management style in education. Moreover, transparency would minimise conflicts between the administration and teaching staff. Again, ideas related to creativity aligned with the teacher's ideas. Originality and novelty were the common themes by the students that could be achieved through thinking out of the box, making minor changes, and deformation the elements. CS2S2 discussed that creativity in textile design could be achieved by building a bridge between expression and functionality. All the students agreed that DRP affected creativity and learning of the students.CS1S1 had a psychological perspective on this relationship. She considered that learning exists in our unconsciousness, and we notice things when we repeat them through some medium of expression. CS2S2 discussed that students identified 'loopholes' in work after the back-and-forth process. Students also supported the idea of memorisation, reinforcement, and consciousness after repeating ideas. Case two and three, students discussed aspects that were not directly related to creativity but market awareness of designs.

Participants of the four case studies believed that DRP enhances students' creativity because of awareness and understanding of the task. Students' repetition and reinforcement of the design

process enable them to generate original and novel ideas. Awareness about textile production and the market also increases with digital reflections.

4.6.3. Prospects of DRP

There were multiple suggestions from all the teachers. One of the propositions sustained in all the teachers' interactions was training and workshop before the formal implementation of DRP. They all agreed that although students use digital tools in their routine life. However, using these tools for academic purposes needs essential technical and conceptual guidance. The other theme was flexibility and adaptability in the medium of reflection, like using videos of different time duration at convenient design development stages and, most importantly, using various art mediums for presentation. CS2T2 and CS4T1 consented that DRP is quicker and more timesaving than conventional reflective journal writing. CS1T2 and CS2T2 emphasized the sharing of data for future purposes.

CS2T2 and CS3T2 highlighted the role of a teacher in the successful application of DRP. A teacher directly interacted with the students and used to be familiar with their strengths and weaknesses of the students. A teacher should know the student's needs and assign the reflection task accordingly. CS2T1 discussed this idea by mentioning that students require continuous motivation and guidance, especially when introducing a new pedagogical approach in the class.

Most of the suggestions from HoDs resembled with teacher's idea of improvement. They all emphasized training and sessions before implementing DRP in the course outline. CS3H proposed some mock reflective practices for the students. CS1H and CS4H proposed that training should be a trickle-down starting from the academic administration, the teachers, and the students. All of the HoDs suggested being flexible in the implementation of DRP. CS1H and CS3H discussed that there would be freedom to use any language. CS2H proposed to use of social media for sharing digital reflections. CS3H needed to favour the rigid three-step model implemented in the current study. CS4H suggested using various software for the reflective practice besides audio and video recordings. CS1H did not appreciate the idea of digital reflection in the middle of the studio assignments. She considered that video reflection should be at the end. As teachers, students also considered that there should be formal training, freedom of the language, and sharing of videos on social media platforms would enhance the impact of DRP.

Summary of the Chapter

This chapter contains information regarding the interviewees' experiences and viewpoints regarding various aspects of DRP. This chapter also discussed the participant's perspectives on creativity. The chapter also discussed how DRP affected creativity, particularly in textile design studios. Individual cases were discussed to understand the themes of the cases. The summary of each case presented an overall vision of the case. Cross-case analysis deliberated the similar and contrasting themes and sub-themes concerning different cases. The chapter prepares and supports the readers in understanding the results and discussion presented in the forthcoming chapters. A table in Appendix 1 titled Summary of the cross-case analysis presented a holistic view of the data analysis. The case analysis summary in Appendix 1 presented a parallel comparison of different themes, categories, and sub-themes. The table (Appendix 1) discussed the perceptions of different participants for case studies. Major themes included: *General perception*, *Challenges and issues*, *Perception of creativity*, *The effect of DRP on students' creativity* and *the prospects of DRP*.

Above mentioned themes are elaborated on in the discussion section to answer the research questions of the present study.

Chapter 5 Discussion

This study has involved the researcher and study participants in reconstructing views about various perceptions of DRP and creativity. Telling and retelling the story during interviews with the teachers and assignments based on DRP was a meaning-making activity for the students. It reflects the participant's interpretations and understanding of certain phenomena from their respective points of view and within the research study context. It is important to reiterate that a point of view is a research construct, and the reconstruction of the project processes is an active interpretation of a story. This chapter summarizes the interpretations emerging from the data regarding DRP and creativity and compares those interpretations with the results from the literature review. This chapter also describes aspects from the data that suggest digital reflective processes and explores those processes considering the results regarding reflection and creativity emerging from the literature. This study addressed the research questions.

- *How do design students and educators perceive digital reflective practice??*
- *In what ways do design students and educators perceive the relationship between digital reflective practice and creativity?*
- *How do design students and educators view digital reflective practice can be used more effectively in textile studio practice*?

A prominent theme woven through most of the narratives was the affirmation of the effect of DRP on the creativity of textile design students. Video reflections became a vehicle for revisiting and re-evaluating past events and further exploring the positive impact on creativity and the design process for studio practice. In this chapter, the results are discussed, considering the existing literature. Particular attention will focus on critical topics related to textile studio practice and digital reflection.

5.1. Textile Design and Reflection

Educators in all four case studies acknowledged the relation of reflection with textile design studio practice. The idea of reflective practice discussed by the participants was close to Schon's (1983, 1987) idea of reflection. The results from the literature review describe reflection as a process that may bring experience or new information to bear on a present situation perceived as problematic. Attending to both the real or imagined difficult consequences of action--in Schon's (1987) terms, the situation's "backtalk" (p. 87) may lead to a new interpretation of the situation or suggest an alternate course of action. How experience is brought to bear on current design problems can be seen when previously used design tactics are used in everyday situations. Participants endorsed Schon's idea of RP using words like "re-designs" and "works back and forth in cases one, two and three. In each of these situations, previously successful strategies are re--deployed in conditions that seem similar because, as Schon (1983) points out, "seeing as of like allows for doing as like" (pp. 138-140).

Participants supported that the design is a conversion process involving problem-finding and solution-seeking. Design requires creativity as an essential activity necessary to bring projects to completion. Reflection within design occurs in the interactive dialogue with materials and as a critical and analytical stance that questions assumptions, sometimes due to a problematic occurrence and sometimes as a probe or scan of the environment to find the problem (Nagro, 2020). According to most participants, reflection within the design is the critical and analytical comparison of potential outcomes based on what is known from previous experience and what is imagined. Sometimes reflection within the design leads to a modification of the design project, and sometimes reflection leads to a transformation of the design process. When reflection leads to adapting the design process, it suggests reflective learning in design, leading to creative design development, also discussed by Banno (2020).

5.2. How do design students and educators perceive digital reflective practice?

Participants of the four cases were familiar with the idea of Reflective Practice. Participants also believed that studio settings in textile design provide a conducive environment for reflection. Koray and Humanur (2018) also discussed that reflection is the basis of studio learning. Students present their work with his idea and verbal presentation and provide feedback. Min-Seok and Mindi (2022) considered the studio practice the desk critique model, which a teacher also identified in CS1 & CS3. Koray and Humanur (2018) discussed that artists and designers should have paid more attention to the written documentation of their work. It was evident from the case studies analysis that departments do not follow any reflective practice model.

Similarly, documentation of the student-teacher discussion during the studio needs to be included in general practice. Report writing is done in two case studies, but it is at the end of the program. CS1 & CS2 mentioned that they motivate the students to do reflective journals. However, they pointed out that these journals should be mature to utilize them for research purposes. Artists and designers are not comfortable with written reflection. For that reason, few researchers have been found in art and design, particularly in Pakistan also discussed by Asghar, Jamil, Iqbal, and Yasmin (2018).

Most participants welcomed the idea of using digital tools for reflection. Participants acknowledged the use new media in education as the landscape of today's education has changed compared to the last two decades (Matos, Festas & Seixas, 2016). Technology and the internet have penetrated different levels of education and learning. Universities have been using learning management systems parallel to campus teaching methods (Reyna, Hanham & Meier, 2018). Technology has a significant effect on today's education and learning (Elangovan, 2021), which was evident from the embracing attitude of participants for DRP. Teacher-centred education has been shifted to a student's-centred approach that made students' attitudes towards reflections a critical aspect. Technical knowledge cannot be ignored in any discipline of education, and computers are the primary tools for its practical implementation. Participants of all the case studies pointed out that the current situation of Covid 19 has optimized the demand for digital tools in education (Schleicher, 2020). Although the use of video in education has been traced since the birth of VHS, its digital video recording brought a significant change because of its accessibility and handy approach. All the Cases were convinced that mobile phones were a handy tool for digital video recordings. The significance of digital recordings and social media in the education sector has been discussed by several researchers (i.e., Castro, 2019; Chan, Churchill, & Chiu, 2017; Paige, Susie & Rola, 2019).

All the participants were confident about the significance of digital video in education. Previous literature demonstrated the magnitude of video in education and related disciplines. The longstanding history of video use in education suggests the helpful role video can play in teacher & student learning. This study further suggested that educators and students find the video a valuable tool in professional development efforts, despite the discomfort it initially caused. Similarly, Nagro (2020) found the process of self-confrontation through digital recordings to be stressful for participants, although all cases eventually expressed satisfaction with the experience. It was evident from the current study that classroom video allows educators to watch their students work without experiencing mid-teaching distractions. Participant teachers in this study found monitoring and evaluating student attentiveness and learning valuable. Lowenthal (2021) reported that teachers could gain insights regarding specific students when watching them on video, an experience shared by participants in this study. Sopka, Hahn, Vogt, Pears, Rossaint, Rudolph and Klasen (2021) found that teachers could better notice student-teacher interactions after watching videos of their classrooms. Despite several technical disruptions and challenges, the participants felt that video captured an often more realistic picture of their work than what was typically seen by a human observer. The current study results

align with previous research supporting educational video use (Herrmann-Werner, Loda & Erschens, 2019; Lowenthal, 2021; Nagro, 2020; Sopka, Hahn, Vogt, Pears, Rossaint, Rudolph & Klasen, 2021).

Besides the significance of digital video reflection in education, a few challenges are associated with this medium, mainly if it is used for reflection. Camera shyness and self-consciousness were among the difficulties discussed in digital video reflection by all the participants, also discussed by Fidan and Debbağ (2018). This issue is exacerbated in the case of female students. All four cases mentioned that Pakistani society does not support female participation in social activities. It was difficult for female students to record and share their audio and videos for reflection purposes. Female students, especially in remote areas, have difficulty using digital media, even for educational purposes. Mehmood, Chong, and Hussain (2018) discussed these challenges for female students in Pakistani higher education. In the present research, this issue was highlighted by the universities situated in rural areas compared to the other three universities selected for the present research. Zoya, Hija, and Zoha (2021) wrote a report based on three case studies. The report addressed the gender digital divide and women's perception of the use of technology. Zoya, Hija, and Zoha (2021) suggested that Pakistani women required exposure and awareness about digital rights and online security issues. A supposition could be extracted from the present research that women are conservative about using the camera in digital video reflections. Overall, culture could be another reason for this attitude, as women also discussed by Schoemaker (2015). But I think this phenomenon needs more exploration and work.

Additionally, English verbal communication was also considered an issue related to the digital reflective practice of art and design students. Maqbool, Ghani, and Maqbool (2018) discussed that the Pakistani education system needs clarification about adopting language as a medium of instruction. The national language is Urdu, but the medium of instruction, mainly after secondary education, is English. Most cases pointed out that when we asked the students to reflect on their work digitally, they assumed we were expecting some content in English. Many students had a phobia of speaking English, so their expressions toned down in video reflections.

It is difficult to deny the significance of digital media in education and reflection, but scenarios change when we formally use a technique or tool. The sense of being judged by someone makes even a straightforward task difficult (Laaser & Toloza, 2017). Present case studies pointed out a similar situation using the digital tool for reflection. At the beginning of the research, participants did not anticipate challenges related to technology adoption for digital reflective practice. However, at the end of the task, teachers considered that students faced difficulty using new media and technology for reflection.

There was a contrasting view about technology adaptation and training between HoDs and students. Students considered that they did not require any training to use digital videos in the reflective process. Elangovan, Guydeuk, Perumbilly, and Awungshi's (2021) point of view could support the student's stance that technology adoption varies within different generations. On the other hand, HoDs emphasized the training before using digital video reflection. Laaser and Toloza (2017) also deliberated on this point and suggested that basic training is required for video if we want to use it for education purposes. HoDs and some students pointed out the teacher's deficiency in using new mediums in teaching and pedagogy. HoDs discussed the technophobic attitude of old teachers as one of the challenges in DRP, also pointed out by Puentedura (2016).

Participants in this study initially made self-criticisms on two levels. The first level was personal, having few reflective outcomes for their practice, while the second level concerned self-criticisms on an education level. The second level of self-criticisms was essential for their reflective outcomes because participants could connect their appearance, voice, and mannerisms to their practice. Students discussed that they did this by setting aside their judgments, focusing less on the superficial aspects

of their performance, and re-focusing their attention on the more critical aspects of their performance while making their videos. This was determined to be a necessary transitional step to go beyond a superficial review and begin a deeper, more thoughtful review of their performance. Prior research indicated that students find it challenging to watch themselves on video for the first time (Herrmann-Werner, Loda, & Eischens, 2019). Therefore, it was important for students to manage their inner critic to focus on more critical aspects of their performance for digital reflective outcomes.

As mentioned, most cases were familiar with the general reflective practice phenomenon. Digital reflective practice was a new concept for all cases. Most participants agreed that DRP is a more accessible and quicker medium than reflective journals. Lockheart (2018) considered that artists and designers are uncomfortable with writing as a medium of expression. Boram, Fraser, and Fillis (2018) also argued that visual artists always seek alternative mediums of expression other than writings. For designers, it is easy to reflect through visuals, which was the stance of most teachers and HoDs in the present study.

Concerning students using video tools to notice, remember, and confirm their thoughts and those of outside observers, this study concurs with prior research that digital videos can aid memory and ensure reflective views of the practitioner observers. Thus, the results confirm gaps in participants' memories or design processes or behaviours of which they were unaware within the studio practice context. The video was used to preserve and play back these events outside of the immediacy of the classroom. Additionally, participants in this study could reflect further by combining video reviews with outside observers' reflective notes and going beyond what they remembered, also discussed by Halter (2016). The video served as the medium to provide reliable, accurate, and beneficial information that participants needed where their memory and outside observation may have been selective, inadequate, or incomplete.

5.3. In what ways do design students and educators view the relationship between digital reflective practice and creativity?

Section 5.2 discussed the ideas related to Digital Reflective practice in the frame of textile design education. In Section 5.3, creativity and concerned ideas are discussed, and then the relationship is explored in the context of the current study and previous literature.

5.3.1. Creativity

Participants of all the cases agreed that creativity is considered one of the discussed phenomena in art and design education, also mentioned by Katz-Buonincontro (2018). Participants discussed various perspectives regarding creativity in the textile design studio environment. Few of the concepts intersect with each other. All the cases consented that creativity is a subjective phenomenon, and it is difficult to state any solid definition of creativity. In cases 3 and 4, the argument between creativity as self-taught or a learned process was more intense. Most participants were inclined to believe that creativity is an inborn talent nurtured by mentorship and environment. Kapkın and Joines (2020) also considered that creativity is used as a descriptive term as though there is general agreement about it.

The theme discussed by all the participants was originality, novelty, and problem-solving skills. One acclaimed definition of creativity is "the ability to come up with an idea which, relative to the pre-existing domain- space in one's mind, one could not have had before" (Boden, 1992, p. 216). This concept leads to two significant areas of concern. Firstly, traditionally, creative thinking is measured based on the outcome of the process, the product. Secondly, creative thinking is a specialized way of thinking or essential cognitive activity. All the participants agreed that the creative outcome should

be original and novel. The process should be based on problem-solving skills related to cognitive and critical thinking, also discussed by Forbes, Han and Schaefer (2019).

All the case studies agreed that creativity is not restricted to academic disciplines like art and design. Creativity is the ability to formulate an idea that challenges and heightens the creator's mind (Crilly, 2017). According to this definition, individuals possess creativity and are not exclusive to artistic fields. The concept of creativity is even vaguer than design because of the highly intuitive and subconscious elements in its development. However, the stimulation of creativity can be triggered, and this area of creativity has been researched at length (Forbes, Han & Schaefer, 2019). Participants had consented that lateral thinking exercises, including brainstorming, can trigger creativity. It is the triggering of ideas that begins the process of design. Idea inception or trigger mechanism is when the creative apparel design process begins. Participants in cases two, three and four explicitly discussed the idea of metamorphosis and design development. This development could be achieved through deliberation and reconnection with ideas also supported by Sawyer (2017).

A variety of opinions were discussed in assessing creativity in textile design. Conflict of functionality and expression was evident from the results of case studies. Case study 1 stressed the aesthetic side of the textile design. According to Case 1, the industrial requirement was considered secondary. Participants from the other 3 cases thought creativity combines artists' self-expression and functionality. Cennamo and Brandt (2012) also deliberated that perceptions and definitions of functionality, aesthetic appeal, or creativity could differ from assessor to assessor according to experience, informative theories, or various cultures.

5.3.2. How does DRP affect creativity?

It was evident from all the case studies that there is an effect of DRP on the creativity of the students, which the continuous use of the DRP could enhance. Four major themes were extracted from the results. All four themes were interrelated and discussed considering the existing literature.

Consciousness and awareness

It was evident from all the cases that DRP enabled the students to be actively aware of the design process and requirements of the studio assignments. The Digital reflective practice of the participant in the present study could be referred to as the three stages: returning to the experience, attending to feelings, and evaluating the experience. The idea of 3-staged reflections utilized by the participants in this study is evident from Gibbs' Reflective Cycle. Gibbs (1988) designed an exercise prompting students to reflect in a more systemic and structured way as a part of his reflective cycle. These reflective processes enabled students to critically evaluate and potentially transform their thinking, perspectives, or behaviour (Tanaka, Okamoto, & Koide, 2018). The students in the current study used Gibbs' sentence stems when reflecting on each cycle step, which encouraged them to digitally document their thinking to separate emotional and rational thoughts regarding their reflection (Quinton & Smallbone, 2010).

According to teachers of the cases, students set goals based on assignment requirements. The assignment requirements, turned into student-specific goals, focused on students' thinking and effort by knowing what to work on in class. As a result, digital video reflections allowed students to set and track their own goals and progress while making connections between knowledge and thinking, leading to an increase in accountability and self-awareness, also discussed by Lew and Schmidt (2011) and Moon (1999). Teachers and HoDs discussed that students became more self-aware and critical in evaluating their thinking and experiences, which changed their behaviour or perspectives. Self-

reflection supports students' awareness of growth. When reflecting on the assignment and one's improvement, participants could recapture their experiences and make greater sense of them. This was primarily due to all participants making specific plans of action to shift behaviour or focus to achieve more remarkable improvement.

According to participants of cases, the digital reflective practice aided one's self-appraisal and gave students a greater sense of ownership in their learning. Since there was evidence of the will to improve and examine how to improve, the individuals evaluated their experiences since their self-concept of capability ultimately impacted their behaviour. These ideas were also discussed by Fergusson, Laan, and Baker (2019). Due to taking the reflective video processes seriously, participants experienced enhanced consciousness and awareness about their work and process, which improved their creativity and performance. Brownhill (2021) argued that the capacity to reflect critically is associated with higher-order cognitive processes of self-regulation, consciousness, and awareness, indicating the highest level of abstract learning. This study discussed consciousness and awareness to understand better the cognitive thinking involved when students engage in digital reflective processes. Reflective processes yielded student accountability and self-awareness. Since reflective processes produce student accountability and self-awareness, revisiting the components of reflective thinking is essential.

Expression and presentation

Exercising personal creativity and engaging in the creative process has been strongly associated with significant expression and exploration in the literature investigating this area. Art and design research discourse consider expressing emotions necessary for growth, insight, and integration (Glăveanu, 2018). In research studies about art and design practice, self-reflection, and growth, emotional expression is often described as a positive outcome of the creative process (Yokochi & Okada, 2020). Emotion expression has been identified as a vital element of the process for individuals who attend art and design programs and for students who were part of a qualitative study on the use of creativity and artmaking to promote students' creativity and enhance their ability to self-reflect (Autry & Walker, 2011).

This study showed that the students found expression and presentation a significant part of their creative process. Creativity was triggered and discussed regarding the art materials, activities, time (limit), and the creative process. The participants expressed how it felt inside and outside their conscious control. As the participants wrestled with the design processes, the words "constrained," "surrender," and "frustrating" were used. Experiencing the process at a deeper level and beginning to reflect on essential phrases, the words "nice," "drawn to," and "enjoy" were present in the students' narratives. As the participants became more comfortable exploring the process, reflecting on their design process during the studio activities prompted a variety of emotions expressed both in the design development and in the digital documentation of the work process.

The exploration experience was present in the studio process, and when the participants viewed their work and shared it with the teacher. Teachers in case 3 discussed that initially, it seemed difficult for the students to talk about their work. However, gradually students developed a level of comfort in presenting their work. Feeling trapped, uncertain, and uncomfortable while exploring complicated feelings during studio design practice are prominent themes in past research related to self-reflection (Theresa & Heather, 2018). These emotions emerged in past studies when individuals struggled to understand and progress in the creative process. The narrative of emotional expression elsewhere in the literature also encompasses the pressure to reach an endpoint and doubts about competence. In case 4, the department head presented the concept of 'Soliloquy' related to creativity. Soliloquy, or speaking one's thoughts aloud, may have helped the individuals order the chaos, provide relief, and

assist the students in identifying with the internal state regarding creating (Vallack, 2021). Teachers and HoDs of all cases, directly and indirectly, mentioned that the art and design activities grew increasingly meditative for the students as they could experience illustrating their internal processes and personal reflections on a medium in front of them.

Participants discussed that the primary emotions, such as frustration and calmness, were experienced and worked through the digital reflective activities. Increased comfort in the creative process allowed participant students to see and appreciate their growth. Creativity and subsequent emotional expression may be invaluable sources of freedom and expression. Varying emotions are described throughout the literature. However, the expression and presentation of these feelings were emphasized the most (Strand & Waller, 2010; Theresa & Heather, 2018). For the participants of this study, digital reflections provided an outlet for presentations and functioned as a form of expression or communication itself.

Meaning making through revisiting thoughts and work

In the current study, individuals shared specific ways of evolving their work once reflecting. Designing was a meaningful process that allowed the students to rework past feelings, thoughts, and events. "Looking back at things . . . as they evolve" and "Having a lens: Making the connection" were two of the powerful narratives encompassing this process. Overall, digital reflections comprised students seeing more clearly, understanding more deeply, and experiencing higher functioning. The value was placed on "making the connection" through self-reflection and realizing whatever was not previously understood. These moments of epiphany occurred because the design process allowed for perspective and insight to happen, as it encouraged self-reflection. The results of this study reinforced what has been written about meaning making concerning the design process and reflective experience. Xu, Zhang, and Zhang (2018) described creating in the external world that was first developed in the inner world can be concretizing for the individual and their creative process.

It was observed by the teachers of all case studies that the students who participated in the design process also appeared to engage in meaning-making during the creative process and self-reflection, which gave them perspective on how their ideas fit into design contexts. In meaning-making discourses, finding meaning is essential in influencing how people interpret and react to different situations and environments. The design process can provide a "re-viewing" of oneself and the environment through artistic creation, also supported by Savolainen, Leppisaari, & Niinimäki (2018). Integrating new aspects can be fulfilling and add value to specific projects or circumstances.

In the current study, participants had experiences that caused shifts in perception and understanding. In "Having a lens: Making the connection," the students found meaning in the new awareness and knowledge about themselves and their assignments. Students agreed that digital videos were valuable sources in revisiting their design process. In "Looking back at things . . . as they evolve," new ways were created in how the participants saw themselves currently. Their path to that point was reflected on thoroughly and made sense. The activity during the present research enabled students to experience a new way of viewing their relationship with their past ideas, also discussed by Jacobs (2018). Prabir and Amaresh (2011) discovered in their search for narratives of growth and transformation with designers employing creativity for their processes that art and design were embedded in a much larger story. A narrative identified was that the artwork reflects an internal shift within the person.

Understanding the task & concept development

Understanding the task & concept development were the areas where the students found meaning during DRP and its relation to creativity. This study's results can fit the broad heading of discourse practising sense-making (Yates, Taylor, & Wetherell, 2001). The design process provides another avenue for narratives to be explored and understood. An image effectively 'holds multiple meanings and ambivalences' (Huckvale, 2011, p. 34). The current study's digital reflections involved accepting a better understanding of the task and further concept development for the assignment.

The holistic view of the participants was that the studio designers explored the development of the concept through methods of self-reflection and artmaking. The idea was acknowledged as ever-changing and viewed as constructed and always in the process of being constructed. The unstable concept development process in textile design assignments was vital for the case 1 narrative. For designers, the most incredible tool is the 'self'. In the discourse of social constructivism, the self-comprises multiple realities as individuals shift and mature. As growth occurs, individuals can restructure how they understand and view truth. The wide range of choices allows individuals to "re-story" or "reauthor" their experiences past, present, and future through the exploration of narrative, also elaborated by Sandra, da Silva, Giuseppe, João, Pereira, Regina, Held, Leandro, and Victor, (2017).

Understanding the task has been identified as a core developmental concept in the design process (Wang, 2021). The teachers shared stories about the students' ongoing concept development through understanding the task. Woven through the students' narratives were moments of self-affirmation in which individuals positioned themselves as growing personally and conceptually. These stories were about realizing specific tasks, finding new ways of integrating parts of the self, activating a readiness, validating visual and verbal analysis, and identifying the significance of memorizing the design process.

Some participants made certain connections while reflecting on their design process that they failed to realize while still engaged in the creative process. The results presented how the design process can take people's places literally and metaphorically. Design Development allowed the students to strongly feel their existence and reinforce beliefs about themselves and their concept of devilment. Like Boldt and Paul's (2011) findings, the design process resulted in physical creations and opened up the potential for growth processes. The narratives in the findings displaying self-reflection and growth support what other scholars have found to be the transforming potential of understanding and developing new concepts.

5.4. How do design students and educators view digital reflective practice can be used more effectively in textile studio practice?

It is evident from the results supported by previous literature that DRP has positively affected the different aspects of creativity and related concepts. Besides applying the current digital video reflection, the participant proposed some changes and reformations that could enhance the impact of DRP on the textile design studio practice. Following are some suggestions presented by the participants for the better use of DRP.

The data analysis in this study revealed that all the students used digital editing to construct their final reflections in case studies two and three. Students began by editing the unusable footage from the original, unedited footage of their video reflections. As found in this study, Useless footage was any shaky, blurry, or messy footage. It could also include long film sequences with repetition or little or no action. Reflection within this level of editing needed to be deeper, as the footage that participants considered for editing was primarily irrelevant to their practice. Therefore, editing is the more technical aspect of the video making process. The students first make editing decisions about

narrowing down the unusable content of the more extensive, unedited footage. The results of this study support prior research on the editing process itself being reflective as students organize, select, and refresh their practice. Trent and Gurvitch (2015) also discussed the significance of video editing in the reflective process. The nature of the digital video involves an iterative set of tasks that cycle between watching, selecting segments, editing video, and creating multiple opportunities for consideration (Sherin & Van, 2012). All the case studies had consented to the freedom to use editing tools for the final video reflections. According to participants, this freedom will enhance the expression and quality of digital reflections.

The participants discussed that students in this study were not trained film- makers or film editors. The quality and quantity of the footage and the editing skills of the participants in this study vaned. Participants realized that it would have been essential for training sessions focused on specific digital video and editing technology skills before the filming and editing process. It will be essential to provide training sessions on video recording, video reviewing, and video editing skills at critical points in the semester when using digital video and editing to reflect on their practice. These sessions will help students plan, prepare, and gain the knowledge and skillsets required to use digital video and editing to facilitate their reflection. Daichendt (2019) also discussed that training and workshops are essential for the professional growth of a teacher and students.

All the participants discussed the significance of social media in sharing digital reflections. Student participants had a more deterministic opinion about using social media with digital reflection. Students pointed out that the world can be viewed as a global village due to social networks, as people can interact with people they have never met. Social networks have partially replaced traditional media forms such as television or radio based on the level of interaction that people can have on social networks. Traditional media provides information and entertainment, but it does not allow interaction. Social interaction is a primary motivator for social networks. Social networks have features allowing users to interact on the internet that meets the need to belong and feel like they are part of a collective group.

Educators and students of the present study agreed that they need to focus on social media technologies to reach this generation. However, due to a social media strategy, they felt they needed more confidence in leading their departments. As a result, the department developed strategies to engage stakeholders to lead social media initiatives. Participants of the present study stressed that universities should make policies and strategies for the effective use of social media in education, also discussed by Niall and Kevin (2015). Social networks allow people to disclose information and visually represent themselves. Social networks also allow people to share visual representations of their relationships (Tobin & Chulpaiboon, 2016). In both cases, social networks allow people to manipulate how they present themselves and their relationships online (Tobin & Chulpaiboon, 2016; Vogel & Rose, 2016). Engagement is a key performance indicator for social media posts (Weiger, Hammerschmidt, & Wetzel, 2018). Most participants considered social media an effective way of sharing videos and involving external sources.

Teachers' attitudes toward digital practice can impact their preference for manual reflections or digital methods. Some teachers may view digital practices as a valuable tool that enhances students' creativity and supports their learning process. They may perceive digital reflective practices as an innovative approach providing unique exploration and experimentation opportunities. On the other hand, teachers who have reservations about technology adoption might be more inclined to rely on traditional manual reflection methods and consider digital practices incapable of fully replacing or replicating the benefits of manual reflections. Several studies have explored the relationship between teachers' digital capabilities and attitudes toward technology adoption. For instance, Smith and Snelson (2010) found that teachers with higher digital skills who were more comfortable using technology tended to have more positive attitudes toward integrating technology into their teaching

practices. Similarly, Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, Sendurur and Yu (2012) highlighted that teachers' knowledge and proficiency with technology could influence their perceptions and beliefs about its effectiveness in educational settings. Participants of the current study agreed that digital reflective practice or reflection through video recordings is a new phenomenon in the Pakistani higher education context. So, educators and students require training before executing this idea in studio practice.

The importance of providing feedback is familiar in instructional design theories. However, traditional theories discussed giving feedback toward convergent thinking/decisions where true or false answers would apply or as reinforcement during programmed instruction. A definite and straightforward answer might not be helpful in designing feedback for creative outcomes where enduring ambiguity is an essential aspect of the process. Guidance from a master would be beneficial in learning design and creativity, as Schon (1987) suggested. Schon provides examples of how the coach is responsible for providing critical thinking experiences and leading the activities in the cases of architecture design studio and piano masterclasses. In both cases, the coach demonstrated, questioned, and guided students to help them form meanings from their experiences.

Educators and students believed DRP should be added to their curriculum and weighted in the academic assessment. Furthermore, students also suggested that video reflection should have proper teacher feedback. It will enhance the quality of video reflection in the future. It was felt from the student's perspective that teachers do not provide effective feedback on their assignments, as supported by the study of Majid and Islam (2021). Teachers mostly follow the grading system and do not provide elaborated feedback on students' assignments and tasks, also discussed by Dou (2015). Students of Case 2 expressed that effective application of DRP could only be possible if teachers also use this medium for instruction and feedback. Iqbal, Saeed, and Akhtar (2019) also discussed that Pakistani university teachers should adopt technological changes in education tools and methods. So, teachers and educators should have training in reflective practice and digital reflective practice.

Summary of the Chapter

In the discussion chapter, perceptions of the study participants about creativity and digital reflective practice are explored and discussed. Research questions were also deliberated considering the result of the study and relevant literature. There are multiple ways to implement digital reflection in textile studio courses. Design educators focus on the intervention of technology and digital communication in pedagogy. During the present study, design educators were convinced about the significance of digital tools and pointed out that more planning and discussion are required for the future application of DRP. Participants were optimistic about the scope of the present research and discussed possibilities of how DRP might influence the creativity and other skills of textile designers.

It was evident from the study that self-awareness is requisite to meet changing professional and academic requirements. The study participants acknowledged a continuous change in digital technologies, and one should keep updating to be relatable with the changing scenario. Training and skill development courses could be the way to cope with this situation. It was viewed that changing the way we think, learn, and use digital technologies in a more 'forward-looking' way could mean embracing a more profound and more self-aware "spirit of innovation" (McKendrick, 2015, Para.2). Besides learning, the creative use of digital technologies is also a challenge (Resnick, 2002) that requires continuous learning and deliberation about the new technologies in the relevant discipline. It is a challenge for designers and design educators to be lifelong learners of tools and use them from novice to expert-level technologies (Blikstein & Worsley, 2016; Gardner & Davis, 2013). In this scenario, the study participants consider that online tools are applicable, and higher education

institutions should focus on flexible and agile learning towards available digital tools. 'Students readily seize the opportunity to work with new technologies and become leaders, entrepreneurs, and innovators despite the challenges of digital transformation (Manyika, 2017, para.2).

Participants in all four cases anticipate the potential use of DRP in textile design studio courses. The influence of DRP on students' creativity also predicted a positive relation. DRP could positively impact the other skills required for textile studio practice. However, collaborative work is required to execute it on different scales. More innovative and active ways of teaching and apprenticeships are required to ready students for digital transformations and agile learning. The existing design pedagogy is cross-disciplinary and playful, but there is still a vacuum for technology-related approaches and resistance to change.

Chapter 6 Conclusion

The present work was intended to contribute to textile design education in Pakistan. Textile design education affects the productivity and performance of the textile industry. The textile industry is one of the most significant sectors in Pakistan that provide a human resource of thirty-two per cent of the total population and produce revenue of about US $ 5.2 billion. Previous literature provided a relationship between the textile industry and the education sector. It was also discussed in the 'introduction' and 'literature review' chapters that there is a margin to work in textile design education. About 45 institutions in Pakistan offer textile design and related disciplines undergraduate programs. But the research contribution needs to catch up to the other areas of textile education (i.e., Textile Engineering, Textile Marketing, and Merchandising). This gap was the initial motivation for the presented research. I have been associated with the textile design higher education sector since 2005. My previous experience also provided introductory knowledge about textile design and related concepts.

Creativity and reflection are essential concepts in textile studio design education. To enhance my understanding of textile design education, I did a literature review about the ideas that could support my present research. It included understanding the design process, particularly in textile design, creativity as a general academic phenomenon and textile design studio practice. Reflective practice was another feature of the presented research. The relation between these two aspects was discussed in the literature review. I narrowed down my study from reflective practice to digital reflective practice. Digital media for reflection were also discussed, emphasising digital video technology in reflective practice in the education sector.

It was evident from the previous research that reflective practice can play an essential role in the professional growth of artists and designers. The literature review chapter also discussed the potential of video and audio recordings. Most previous literature on the relationship between creativity and reflective practice and DRP is based on teachers' experiences and perspectives. Limited studies are found that discovered that students' experience related to DRP. The literature review suggested that video reflection provides opportunities for enhancing creativity in studio design education. It was also evident from the previous literature that there needs to be more research in art and design education, specifically in Pakistan. Research opportunities in Pakistani textile design education and the benefits of DRP in studio practice provided the logical foundation for the present study.

Previous literature suggested that Reflective Practice is vital for textile designers' personal and professional growth. Emotional responsiveness is a reflective practice component, and tools such as digital video and audio can develop reflection. However, these tools have yet to be systematically implemented and investigated in the textile designer development literature. Consequently, more is needed about textile designers, especially beginning to develop digital reflective Practice, particularly in Pakistan. The purpose of the present study is to explore the digital reflective process throughout the studio design through digital audio and video recordings. Multiple case study methodology was used to answer the research questions. Before selecting the research method, deciding the present research's theoretical underpinnings was critical. A constructivist-interpretivist lens informed this study. Constructivism describes how students process and reflect on knowledge within the underlying social environment. Digital tools were used for reflection and interaction with the participants.

The present study examined the DRP at four departments of higher education institutions by employing a multiple-case study method. Yin's (2009) case study research and methods guided the present research design. The three research questions for this study sought to explain some current circumstances, and thus, the case-study method seemed appropriate. This method was appropriate because the three research questions require an in-depth description of an existing studio practice in

textile design. Developing "what" questions validated the need to implement a case–study approach. This study employed interview questions aimed at teachers, heads of departments, and students. Butin (2010) also stated that "an exploratory dissertation design is best used when an issue is not well understood in the literature or previously unexamined in a particular fashion" (p. 80). This design lent itself to qualitative research methods that allow for in-depth analysis of issues and are flexible enough for the three participants. This also allowed for examining standard views about DRP and deeper exploration into department-specific aspects. Finally, the opinions of students and educators informed the reader what possible ways are and how DRP can be used more effectively in textile studio practice. The present research was conducted in four departments of four universities in Pakistan. All the universities offer undergraduate programs in textile design. Studio courses were selected for multiple case studies based on homogeneous purposive sampling. The research design employed a multi-stage approach. After choosing the institution, three types of participants interacted during the presented study: Teachers, students, and heads of departments.

The research objective was to explore better the nature and context of creative processes in textile design and ultimately help design students support their creative potential. Our overarching goal was to propose a framework for characterising digital reflective practice in design, particularly textile design, highlighting practices that lead to new ideas and insights. It was concluded from the current study that textile design studio practice provides a conducive environment for reflection in action, reflection on action, and DRP. The participants also suggested that reflective practice in design leads to innovation and problem-solving. This study resulted that DRP affected the creativity of textile design undergraduate students in a positive way.

6.1. Implications and Recommendations

From participants' perceptions, different implications and recommendations have emerged that could be useful for the future application of DRP. It is important to note that improvements can be made to elicit better data and create a better experience for participants through this method. The following sections discuss the implementations of this study and suggestions to provide proper infrastructure, training, support, and guidance for the use of the digital method for reflective purposes.

Training and Mentorship

As mentioned earlier, student participants in this study were not trained filmmakers or film editors. The quality and quantity of the footage and the editing skills in this study vaned. It would have been essential to provide training and mentorship focused on specific digital video recording and editing before the filming and editing. It will be important to provide training sessions on digital video recording, video reviewing and video editing skills at critical points in the semester when students s use digital video and editing to reflect on their practice. These sessions and mentoring will help students plan, prepare, and gain the necessary knowledge and skillsets to use digital video to facilitate their reflection. These sessions can help students to engage with more sophisticated technology use. In addition to the types of mentoring models, design departments should consider e-mentoring, where convenient interactions can occur online.

Capacity building for a digital transformation

Digital transformation is one of the challenges of today's education and is required for student designers and textile design educators. Capacity building for digital upgradation and modification needs the availability of relevant software, technical tools, and institutional framework. Finance and budgeting also play an essential role in digital transformation. Besides the infrastructure, appropriate and skilled human resources are also necessary. Successful organizations consider the impact of continuous training of designers and educators.

Digital resource availability

Higher education institutions should do proper planning for the availability of digital resources. Digital libraries, archives and software should be in access by every student and teacher, and computer labs should be upgraded and planned according to students' strengths. Pakistani Universities face criticism about the digital infrastructure. The present study emphasizes digital tools for recording and reflection. For the creative use of digital reflection, proper facilities should be available for videography, audio recording, editing, storage, and online sharing. Institutions' environments should support self-directed learning towards digital tools, and students should be aware of digital transformation opportunities and challenges.

Self-directed and self-regulated learning skills

Some participants discussed the phenomenon of recording skills and suggested that online tutorials are a good source for learning basic recording and editing skills. Requirements for the reflective material in the curriculum differ from time to time. Similarly, technology changes over time. The span of technological change has become short because computers are more advanced and powerful than ever before. Dealing with this fast pace of technology is one of the challenges for educators and designers. In this scenario, self-directed and self-regulated learning skills are critical for teachers and students. Designers and educators can upgrade themselves through self-directed learning. Much content is available on the internet about textile design and digital technologies. Students can benefit from digital content as self-directed and self-motivated learners.

Active learning and flexible learning methodologies

Self-directed learning cannot be nurtured in traditional education and learning settings. Some participants pointed out that the curriculum of Pakistani textile design education needs to be more active and capture the student's interest in technology and digital tools. Different strategies and tools should be used for active learning. Moreover, flexible learning methodologies should b be appreciated in textile design studio practice. Theoretically, this sounds simple, but some practical complications exist in applying unconventional tools in textile design studio education. Teachers' clarity and motivation are critical that will trickle down to the students. There should be understanding between student-teacher or a designer-employer to support agile education methodologies and active learning without feeling threatened by their academic result.

Teachers' clarity and motivation

According to many participants in the present study, there needs to be more relevant content related to digital technologies and textiles. "Learning objectives require students to operate exclusively at a depth of knowledge" (Stubbs, 2019, para.2). Participants reported that employers are concerned about the hands-on knowledge and experience and not the in-depth or critical approach toward digital tools. Adobe Photoshop is one of the popular tools in textile design. Students also seek basic knowledge rather than gaps in knowledge. In this scenario, the role of the teacher is critical to "transfer ownership of learning by partnering with students" and "co-construct success criteria'(Hattie & Zierer, 2019, p.33). Teachers should focus on the critical use of the software and motivate students to forward and futuristic use of it.

Teamwork and collaboration

Study participants discussed an essential theme about implementing DRP and other digital tools in design education. Boundaries between different academic disciplines are diffusing. To meet the upcoming challenges of the 21st century, scholars should think and work on cross-disciplinary and collaborative projects. Blended learning, open courses, and flexible education allow students and teachers to work with an interdisciplinary approach. But practical execution of this concept requires teamwork, interpersonal communication skills, virtual knowledge, and cross-disciplinary thinking. Usually, students work individually on their assignments and projects in textile design studio practice. But the situation has changed after the digital revolution in the 21st century. Now designers are using various digital tools for design development and portfolio compilation. For this purpose, designers are collaborating with computer and IT-related persons.
Similarly, universities are offering cross-disciplinary programs like textile marketing and fashion merchandising. These courses are a blend of management sciences and art and design. Participants suggested that digital platforms have challenged the conventional portfolio method. Digital portfolios simulate the design process and real-time situations that can be achieved through proper teamwork and collaboration.

Implications on personal teaching practise

It is concluded from the current study that DRP in textile design studio practice positively affect creativity and strengthens more effective ways of the design process. Digital reflection helped students gain a more comprehensive view of the situation of the given task. This inquiry aimed to understand the various influences on creativity by identifying occurrences in textile design. The process attempted to uncover the assumptions from existing literature about digital reflection in art and design education. Although the digital tools did assist students in building confidence in their designing abilities, the mobile devices did not provide positive experiences; instead, my facilitation of an emancipatory perspective initiated the basis for meaningful digitally mediated designing. Several implications for teaching practice emerged from the conclusions. These implications provide valuable insights and considerations for educators in the field.

The assumption that some students can grasp personal and social issues in their work highlights the importance of fostering critical thinking and self-expression in textile design education. Recognising and encouraging students' ability to address meaningful themes and engage with social issues can enrich their creative output and contribute to their overall growth as designers. The significance of listening and reflecting on students' opinions is emphasised as a crucial aspect of effective teaching. Teachers can create a supportive and inclusive learning environment by actively listening to students and valuing their perspectives. This practice encourages open dialogue, promotes student agency, and allows for a more collaborative and student-centred approach to education.

Sharing personal experiences and examples of digital use in textile design education is an effective strategy to inspire and engage students. By drawing from their own experiences, teachers can demonstrate digital tools' practical applications and benefits, making the learning process more relatable and relevant for students. The recognition that media influences students and their creative output highlights the need for educators to address media literacy and its impact on design choices. Educators can facilitate critical discussions about the role of media in shaping perceptions and encourage students to consider how media influences their design process and decisions.

The understanding that teachers can learn and grow through students' narratives highlights the reciprocal nature of the teaching-learning relationship. Teachers can gain valuable insights from students' perspectives, experiences, and cultural backgrounds, allowing for a more holistic and

culturally responsive approach to instruction. Lastly, recognising students' diverse creative abilities influenced by culture and background emphasises the importance of fostering an inclusive and culturally sensitive learning environment. Acknowledging and valuing students' diverse perspectives and creative expressions enriches the learning experience and contributes to a more inclusive educational setting.

Through this research, I took an in-depth look and presented findings from case studies of students in a textile design studio course. The empowering educational model is an ideal plan with logical agendas and values for practice. However, the experiences of an empowering classroom will be different for each student and each teacher, depending on the background, the conditions, the subject matter, and the mindset of the participants.

This study is not meant to characterize the textile design processes of students in different domains. While I gathered a rich picture of how I approach teaching and students' approach to the process of textile design, it is certainly not a complete picture of all practices or the students' experiences. All the narratives I have provided have been filtered through interpretive lenses, and since I have described various but selected scenes and nuances, I have controlled each tale. While this study was not designed to develop generalizations that hold across all contexts, particular insights gained may have implications for other art and design teachers. One important finding is that social reconstructive and emancipatory pedagogy can effectively enhance textile design studio practises. All the students used personal experiences and social perspectives to produce digital reflections. Participants used an empowering process approach involving self-reflection. Empowering/ emancipatory process was embodied in the structure of textile design assignments. Since emancipatory ideas encompass many concerns about the community and culture of the students and since an emancipatory pedagogy insists upon students experiencing a process and reflecting on themselves, these pedagogical ideas can be helpful in all aspects of the educational setting. The empowering process can significantly continue to students' self- reflection. Students demonstrated these reflections of themselves within their assignments and critiques of the outcome of textile design studio practice.

6.2. Original Contribution of the Study

Valid research studies should facilitate and encourage debate on educational issues if they are worthwhile investigations. This study does encourage this debate on several levels. While many studies have examined reflective practice in various academic disciplines, limited studies are found in art and design education. Digital reflective practice and reflection through audio and video recording is a new phenomenon in traditional reflective journals. Virtually no studies examine how DRP affect students' creativity in textile design studio practice.

Multifaceted investigations of reflective practice are suggested at both the level of pedagogy and policymaking in art and design. Most research on reflective practice (in art and design) has examined how teachers have implemented it. However, it has not considered the student's reflective process and their opinion about the effect of RP on the creativity of the design process. In addition, as reflection broadened to include digital formats (i.e., audio and video recordings), how students reflect in a digital environment compared to paper- based reflection became another critical area of the present research. The findings of this study suggest that students do not experience much difficulty when trying to grapple with new forms of reflection (i.e., digital). The integration of DRP involves using video and & audio tools which students have already been using in their daily life and not the reorientation of studio class culture. In moving from a reflective journal to a digital reflection, we must consider and explore how the culture of the studio class changes and how that, in turn, affects student learning and creativity.

A literature review has identified the need within the community of art and design researchers in Pakistan to investigate studio pedagogy strategies in the local context. It is required to build a common language and theoretical framework for understanding: (a) the potential differences between the concepts of reflection and digital reflection and (b) how quality and strategies in digital reflection affect the creative process of design development. Continued rigour debate is required over the essential constructs of digital reflections and creativity in textile design practice. Finally, this research pointed to essential factors influencing how students reflect on and evaluate their creativity in the design process. The present study focused on the local application of DRP within contextual factors. The learning environments that produce successful designs may differ from environments where traditional instruction and assessment are conducted. The present research genuinely contributed to art and design education as the literature review identified this kind of research vacuum in the Pakistani higher education context. The findings revealed that a digital reflection is a helpful tool for textile design students to develop their studio designs. The participants could recognize and begin to self-direct their understanding towards design assignments and concept development for novel product designs. Watching the video gave the textile design students evidence of changes that needed to be made and the time to self-reflect on how to make those changes best. When the students made these changes, they noticed more class engagement. As the students showed learning and attention, they became more confident about their work. The study's results demonstrated that Digital video reflection was helpful for students to utilize to become better designers.

The future applications of this project could be amended in several ways. The first is to require all students to participate in the assessment process. Students could be adapted from a pure assessment process into a graded entry activity. Teachers then make constructive guidance that is goal setting and graded in return. In video reflection format, the instructor could use student reflections on their class video. This system of communication would allow teachers to gather more student-centred information. Teachers could then assess student needs and help tailor their classes to meet the dynamic needs of each group.

The second way to improve this study is to schedule a fixed time to review the videos. It should be designed soon after each recorded session. This would allow two benefits: first, the class will be current in the thoughts. Second, it will give the participants more time to process and work on class issues before the subsequent video reflection. Time-bound would provide the students with the maximum opportunity to benefit from the video reflection process. The third way to improve the video reflection process is to give the students a second camera angle to watch. This recording should use a wide-angle fixed camera view of the design-making process. This would help the students examine their movement tendencies and classroom behaviours and better assess assignment understanding and progression.

The fourth way to improve this process is to provide meeting times where the subjects come together to discuss issues with a teacher. Both teachers and peer support can help identify and solve problems in the design process. The results provided more options and possibilities to solve their design issues and an opportunity to receive more informed feedback from others. The students could extract a short video clip of a situation to reactive advice. This could be voluntary and requires reflecting on the video before choosing a problem to share. Departments should Include more professional development before the video recordings cycles to build relationships, potentially leading to more in-depth discussions. Teachers' practice with providing student feedback and responding to journal prompts would deepen the learning. More participation by the teacher/facilitator. The minimally invasive approach gave participants too much freedom to veer off task and too little guidance in critically examining practice. Research has shown that the prompting provided to the participants by the facilitator to stimulate discussion can positively impact the design process and the quality of learning that results from the debate. Finding the right balance of allowing participants to explore and think

deeply versus steering the discussion towards the beliefs or expectations of the teacher is a critical matter and needs consideration in advance.

Present research did not profoundly explore, and a certain level of participant knowledge of effective instructional practices was assumed. Post-cycle discussions were not recorded or captured as data but contained richness in conversation. Future researchers may want to include these discussions as evidence of learning. Incorporate focus group discussion protocols that provide specific questions to promote depth in exchange. The facilitator might use a series of questions: What did you hear/see significant? What worked well in supporting student learning, and what evidence suggests it worked well? What was challenging, and what evidence suggests it was difficult?

Reflection as a method to improve design practice is well-grounded in research. Numerous studies with varied approaches have concluded that when designers study their course, identify dilemmas, and use an inquiry approach to improve practice, efficacy increases with enhanced creativity. To be reflective, designers must seek new knowledge and combine that knowledge with previous experience to make meaning. Additionally, designers must be willing to identify areas that need improvement in their practice and take a problem-solving approach to make required changes. They must also collaborate with others to enhance understanding, generate new ideas, and explore available options. Moreover, finally, designers must value professional growth in themselves and support the development of others to benefit from the reflective process fully.

As a tool to enhance reflection, digital video recordings a record in real-time for participants, enabling them to retain a reliable memory of their design process. Reflection is based on what one believes to have happened, and the digital video provides the indisputable evidence needed to build trust in the growth process. However, the current study indicates that clear structure and guidance are imperative if textile design students demonstrate strong reflective capacity and provide and accept critical feedback about creativity and learning. Although design educators and students valued the DRP and developed some insights about the design process, their lack of critical feedback could have improved their exposure. Specific actions by the professional development facilitator are necessary to support the essential provision of input and the development of robust reflective capacity. Much has yet to be explored regarding the impact on students' creativity to become more effective. DRP can potentially be a powerful method of increasing creativity, efficacy, and student achievement.

The present study proposed many innovative actions and possibilities in textile design studio pedagogy and practice. Assessment of creativity in textile design studio practice has a lot of margins. A teacher should be aware of various factors that influence creativity. This study explored the relationship between creativity and DRP, a novel idea. But many aspects and characteristics need to be explored, particularly in the Pakistani context of textile design education. Another area addressed in the present study is incorporating digital tools and planning strategy of its implication. This study contributed to this area by applying reflection in action and reflection on action concepts. Variations and possibilities can be explored in more detail for future options. Participation of the students was voluntary in the present study. The students' response rate was reasonable; most did digital reflection in studio assignments. Students will do digital reflection with more interest if digital reflection adds to their assignment handout or curriculum. But before this, there is a need for deliberation in the social and cultural aspects of the university or institution.

6.3. Limitations of the Study

The study has certain limitations, with the first being that the sample taken from the students needed more substantial to draw fair conclusions. The second issue was that the video recording followed the studio's design process and needed help capturing the student's thought processes. Students could

focus on either the design process or their reflective thoughts. The students were asked if they saw learning happen while watching the video in the questioning process. The students would have been better able to assess student learning if there had been two cameras. One camera would follow the design process, and a second would document their thoughts.

Another issue was related to the difficulties in the protocol. The students did not stay on an efficient schedule to produce the highest learning potential. Students became busy with other work in the digital reflection and needed help to view the recordings and reflect within a consistent time frame. Subjects viewed the videos the night before the next or three weeks after the initial recording. This issue happened to most of the students. This meant that the subjects often needed to benefit from evaluating the previously recorded reflection before recording a new video. This situation may have prevented more findings from being discovered.

Most of the students volunteered for this study because they wanted to engage in a creative process and talk about their experiences with others. Students with different motivations may have shared more distinctly different or negative stories and other aspects of their experiences. It is also important to note that the selection of students was predominantly from Punjab province (Pakistan). Students from different backgrounds may have told very different kinds of stories. Other samples may not have experienced intense emotion during digital reflection or may have found the experience particularly helpful in ways that the participants in this study did not. The stability of personal, social, and financial resources may or may not have been influenced. The experience of individuals who participated in the study may have been negotiated by the time limit, social desirability, and location (their place of education). Another factor that may or may not have swayed the results is the type of people who chose to participate in this study versus those who decided not to attend.

Further limitations included the amount of time, resources, and expertise the researcher obtained regarding enacting this study's procedure. Finally, qualitative research takes a post-positivist stance that researchers cannot help but subjectively influence the conclusions. It is essential to the validity of research to be aware of this influence (Fitzroy, 2018). It is crucial to note the biases I held as a researcher. The studio environment would facilitate students' creativity, growth, and self-reflection. Participants would also experience positive self-exploration by engaging in these sessions. As a design educator, I also felt that these exercises would be beneficial for training design students or other students studying other art and design-related professions.

According to Almeida, Faria, and Queirós (2017), the researchers do not have access to the experience of others; they only offer representations of it. This study shares a common issue in qualitative research: no absolute claim can be made regarding the relevance of results beyond the application to the context of the participants as represented by the researcher. All the previously noted influences and confines are worthy of inspection and may offer further illumination into the participants' accounts than what has been provided. I have made the best attempt possible in the role of the researcher to conduct the current study, and, ultimately, it is up to the reader to judge the findings for themselves.

Summary of the Chapter

The present study concluded that there is a margin to work to improve art and design education. Digital reflection tools help students learn technical skills and innovative education practices that enhance their creativity and problem-solving skills. It was also discussed that students could only become independent learners with initial guidance and support. Digital reflective tools help students be agile at self-learning, but this could be possible without intense technological permission and conceptual clarity using digital recordings for reflection. Conventional teaching and learning models cannot support digital transformation in textile design education. Innovative initiatives are required to execute DRP in textile design education. Like, working spaces should be redesigned according to

new technological requirements. The curriculum should also be revised, considering the 21st-century education vision. And teachers should be well-informed and equipped with changing scenarios of education.

The present research also discussed challenges associated with digital transformation in universities and higher education institutions. Motivation and conceptual clarity are the educator's foremost challenges, which trickle down to the students. Teachers should have the courage to adapt to changing teaching methods. The study participants acknowledged that learning requirements had evolved with time, and it's a need of the day to be a part of this evolution through acceptance and adaptability. It was evident from the present study that digital reflections help in self-directed learning and continuous learning practices in addition to the creative process in textile studio design. Effective use of digital DRP could be possible through collaborations, alliances, and a cross-disciplinary working approach. Currently, many departments of textile and related disciplines are striving to deal with issues and challenges that emerged in response to digital transformation and collaborative research approaches.

This study aimed to determine if digital video reflection could be a helpful tool affecting textile design students' creativity in studio design practice. A method to accomplish this task was to explore the creativity in textile design and then compare those findings to the subjects' discoveries. By the end of the study process, all participants reported having higher confidence in the design process. During their interviews, all the students said they would like to continue using video to reflect on their work because it helped them understand the design process better. What became interesting was the range of initial issues they addressed in their assessments. Initially, they noticed topical problems such as negative habitual mannerisms: fidgeting, unnecessary verbal tendencies, tone of voice, and clarity. Other topical issues were time management and spending too much time remembering a combination. Most of these problems could only be partially corrected over the current eight-week research activity. Still, all the participants benefited from seeing and realising what changes they would like to make.

As the participants progressed through the study, they began to analyse deeper issues such as their class structure, personal beliefs, and student-to-teacher connection. Students started spending more time reflecting on their own experiences as students and on the teachers they had. Another exciting advantage they discovered was a deeper insight into the design process (particularly concept development) when they watched the video and progressed in design development. The pattern of digital video self-reflecting and taking the class helped the students gather more data from which to build their concepts. They could also concentrate on developing their understanding of the assignments by mirroring the behaviours of the teachers. After watching their video, the students could see how they were performing and progressing. The students took the time to think about what they liked and then began to apply it to their assignments. By the end of the study, all the participants found that they performed well in the design process, enhancing their creativity and giving them more confidence.

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Appendices

Appendix 1: Summary of cross-case analysis

Themes	***categories***	**Case Study 1**	**Case Study 2**	**Case Study 3**	**Case Study 4**
		Key Points	***Key Points***	***Key Points***	***Key Points***
General Perception	***Familiarity with DRP before the current study***	Teachers were Familiar with reflective practice but didn't practice any model		Familiar with the use of digital tools in education	Teachers were Familiar with reflective practice but didn't practice any model
	Conducive for Textile Design studio settings	Critic and jury session	Report Writing	Continuous student-teacher interaction Desk critic model	Reflection in design studios
	Opinion about digital tools in education	Digital tools are the requirement of today	Integration of education with day to day activity	Technological advancement through time	Welcome to new technologies
	Reflective journals vs digital video reflection	Digital recordings are easy	DRP are quicker than reflective journals		Time-saving for future
	Other	HoD was not satisfied with the current strategy			
Challenges and issues	***Camera shyness***	The consciousness of self-image	camera shyness	camera shyness	Difficulty in Self-shooting
	Cultural/religious restrictions	Trust issues depend upon the nature of the assignment		The veil is mandatory in many families	Family restrictions Veil and the Abya for

					female students
	Communication in English	Phobia of English communication	Phobia of English communication	The anxiety of speaking English	
	Technological issues	Technology issue (realized after the activity)	No technological issues Difficulty in technological adoption by textile design students	No technological issues Suggested technological training at the end	No technological issues Training required for complicated hardware and software
	Neophobic/technophobic attitude		The technophobic attitude of some senior faculty	Some teachers had an issue learning and adopting new technologies and advancements	
	Other	Limitations of online education Time Management	The bureaucratic process of institutions		Lack of critical thinking in the early education system of Pakistan
Perception about Creativity	***Inborn skill vs developed through learning***	Creativity is subjective	No solid definition of Creativity/difference for different people	Inborn talent nurtured by mentorship and environment	Self-taught vs learned process: Dual point of view
	Originality and Novelty	Innovation Thinking out of the box	Originality and Novelty	Originality	Novelty and uniqueness of any idea or product.
	Problem-solving	Problem-solving	Problem-solving	Problem-solving	
	Function vs expression	Trickle-down from academia to industry	The bridge between expression and functionality Creativity is just another term for expression.	Critical thinking of a fine artist with logics of scientist	Domain-related knowledge lead to more creative solutions

				Imagination is more important than knowledge	
	Design Development		Metamorphosis, A holistic view of the design process	The report, respond, reason and relate/reconnect	Develop through deliberation VS spontaneous
	Fusion	Ordinary stories in unique ways	Aesthetics with product execution	Ideas and materialization	Deformation Ordinary and unconventional
Effect of DRP on student's creativity	***Consciousness and awareness***	Awareness about process Learning exists in our unconsciousness understanding the task	The subconscious mind starts reflecting on your conscious thoughts Conscious about their work	Conscious and actively aware	Continuously aware of the market trends and styles Confidence & awareness
	Enhanced expression & presentation	Enhance observation	Soliloquy Self-expression		Develop level of comfort in the presentation of the work
	Reinforcement through repetition	notice through repetition	Verbal communication boast thought process	revisiting actions lead to different perspectives Reinforcement through repetition	Verbal communication boast thought process
	Burden during the design process	Burden when performed in the middle of the design process			Slow down the design process

	understanding the task & concept development	visual and verbal analysis	Identifying the loophole of the work	Memorization of the design process	Memorization of the design process
	Other	Digital reflection has nothing to do with creativity Documentation	Check system	Documentation Active learning	Mobility of the work
Scope & limitations of DRP	***Freedom to use medium, duration and timing***	No time limitation Freedom to use any language	Flexibility in combining other art/presentation mediums No restriction of language	Against strict three-step model	Use of various software in designing and reflection
	Social Media	Sharing through Social media	Social media is a fertile land to grow interaction and communication	Social media add interest and excitement	
	Reflective journals vs digital video reflection	Digital recordings are easy	DRP are quicker than reflective journals		Time-saving for future
	Training and workshops	Emphasize proper training Teacher training and exposure	Training in using the DSLR camera	sessions and training mock reflective practice	Trickle-down training
	Assessment and grading			Mandatory reflective practice	Difficult to convince students to perform an activity without assessment
	Other	Should be at the end	two-way process		should be added in the early education

Appendix 2: Interview Guide for teachers

Interviewee: Course teacher Studio Design
Interviewer: Umer Hameed
Purpose: Thesis, Doctor of Education
Thesis Title: *Exploring the effect of digital reflective practice (DRP) on the creativity of textile design undergraduate students: a multiple case study*

Interview protocols and questions

Online interviews are part of the thesis project titled' *Exploring the effect of digital reflective practice (DRP) on the creativity of textile design undergraduate students: a multiple case study.'* Interviews will be open-ended**.** The frequency of the interaction will be once in a fortnight. The duration of the studio assignment is about 4 weeks. So, 4-6 interviews will be conducted with the course teacher. Participation Information sheet, consent form, and other related documents will be sent to the teacher through email before the formal commencement of the interview.
The following are some points related to online interviews with the teacher.

- The online interview will be conducted through Zoom, skype, or any other online tool teacher feel secure and comfortable.
- The interview will be of about 40 minutes in duration
- I will use the recording option/application to document our conversation. This conversation will be remained confidential and will not be shared by any means.
- The interviewee will have the right to not share your personal or official perspective in response to any question
- All the information will be used for the related research purpose.
- The summary/transcription of the interview may be provided on teacher demand prior to its formal use for data analysis or any other research activity.

Thank you for your time and agreement

Interview Questions *

1. Please tell me about yourself. Your academic and professional background?
2. For how much time have you been in the teaching profession?
3. For how long you have been involved with this studio course?
4. What do you personally think digital reflection is for?
5. Can you describe how digital reflective practice (DRP) is incorporated into your course?
6. How are students on your course supported to be digitally reflective?
7. How do you understand your own role in terms of supporting or guiding digital reflection?
8. Are there any problems for you with the notion of DRP?
9. Are there any awkward issues involved for you in this way of teaching?
10. How 'real' or 'authentic' does your students' digital reflection, seem to you?
11. What kind of identities do you think students negotiate or manage when working in this way?
12. Do you think your students enjoy doing digital reflection?
13. Who does/doesn't? enjoy doing digital reflection?
14. Do you enjoy watching your students' digital reflection ?
15. What are the tools students like to use for DRP?
16. Why students use a specific tool for DRP?
17. Do technology and training are the problems for you with the notion of DRP?
18. If Yes! (Q,21) How could it be handled?

19. Are there issues around trust and the student-tutor relationship that are different in the way of DRP?
20. How could DRP be used more productively, in your opinion?
21. Do you think the DRP supported to bring about change?
22. If Yes! (Q, 25) how DRP supported to bring about change?
23. Which of the following aspect of design development is affected by DRP?

- Understanding the task
- Concept Development
- Developing a preliminary layout
- Final design
- Presentation & execution

24. Is there any other aspect (other than mentioned above) which is affected by DRP?
25. Do DRP effect on the creativity of students?
26. If yes! (Q,28) how DRP effect on the creativity of students?

** This will be a semi-structured interview, so there is a provision to change or evolve questions according to the response.*

Appendix 3: Interview Guide for HoDs

Interviewee: Head of Department
Interviewer: Umer Hameed
Purpose: Thesis, Doctor of Education
Thesis Title: *Exploring the effect of digital reflective practice (DRP) on the creativity of textile design undergraduate students: a multiple case study.*

Interview protocols and questions

Online interviews are part of the thesis project titled' *Exploring the effect of digital reflective practice (DRP) on the creativity of textile design undergraduate students: a multiple case study.'* Interviews will be open-ended**.** The frequency of the interaction will be once after the completion of 2 assignments. The duration of the studio assignment is about four weeks, and the study will consist of completion of two assignments. **1** interview will be conducted with the HoD or equivalent position. Participation Information sheet, consent form, and other related documents will be sent to the HoD through email before the formal commencement of the interview.
The following are some points related to online interviews with the HoD.

- The online interview will be conducted through Zoom, skype, or any other online tool HoD feel secure and comfortable.
- The interview will be of about 40-60 minutes in duration
- I will use the recording option/application to document our conversation. This conversation will be remained confidential and will not be shared by any means.
- The interviewee will have the right to not share your personal or official perspective in response to any question.
- All the information will be used for the related research purpose.
- The summary/transcription of the interview may be provided on demand prior to its formal use for data analysis or any other research activity.

Thank you for your time and agreement

Interview Questions *

1. Please tell me about yourself. Your academic and professional background?
2. For how much time have you been in the academic profession?
3. For how long have you been heading the department?
4. Are you satisfy by strategy opted in textile design studio course to introduce and execute DRP
5. What could areas of planning be improved in the application of DRP among textile design students?
6. Have you observed any awkward issues in this way of teaching?
7. Have you observed any problems with the notion of DRP?
8. What kind of identities do you think students negotiate or manage when working in this way?
9. How did the DRP that is practiced by students of textile design help or hinder their learning?
10. How did the DRP that is practiced by students of textile design help or hinder their creativity?
11. What are the common problems students face in the application of DRP
12. Do technology and training are the problems for you with the notion of DRP?
13. If Yes! (Q,21) How could it be handled?
14. How could DRP be used more productively, in your opinion?

15. Is there any other aspect (other than mentioned above) which is affected by DRP?
16. How you define creativity particularly related to textile design
17. Do you have a plan to use DRP in other courses of design?
18. What is the major problem or challenge in the implementation of DRP in the curriculum of textile design?
19. How digital reflective practice affect the creativity of Pakistani undergraduate students in the textile design studio course?
20. What are the areas in textile design education which improved by the use of the digital reflective practice?

* *This will be a semi-structured interview, so there is a provision to change or evolve questions according to the response.*

Appendix 4: Interview Guide for Students

Interviewee: Head of Department
Interviewer: Umer Hameed
Purpose: Thesis, Doctor of Education
Thesis Title: *Exploring the effect of digital reflective practice (DRP) on the creativity of textile design undergraduate students: a multiple case study*

Interview protocols and questions

Online interviews are part of the thesis project titled' *Exploring the effect of digital reflective practice (DRP) on the creativity of textile design undergraduate students: a multiple case study.'* Interviews will be open-ended**.** The frequency of the interaction will be once after the completion of 2 assignments. The duration of the studio assignment is about four weeks, and the study will consist of completion of two assignments. **1** interview will be conducted with the students who have experienced DRP during studio assignment.
Participation Information sheet, consent form, and other related documents will be sent to the student through email before the formal commencement of the interview.
The following are some points related to online interviews with the student.

- The online interview will be conducted through Zoom, skype, or any other online tool student feel secure and comfortable.
- The interview will be of about 40-60 minutes in duration.
- I will use the recording option/application to document our conversation. This conversation will be remained confidential and will not be shared by any means.
- The interviewee will have the right to not share your personal or official perspective in response to any question.
- All the information will be used for the related research purpose.
- The summary/transcription of the interview may be provided on demand prior to its formal use for data analysis or any other research activity.

Thank you for your time and agreement.

Interview Questions *

1. Please tell me about yourself. Your academic background?
2. For how much time have you been studying textile design?
3. For how long have you been in the present institution?
4. Are you satisfied by strategy opted in textile design studio course to introduce and execute DRP?
5. What could areas of planning be improved in the application of DRP among textile design students?
6. Have you observed any awkward issues in this way of studying?
7. Have you observed any problems with the notion of DRP?
8. What kind of identities do you think you negotiated or managed when working in this way?
9. How did the DRP that is practiced by you (and other students of textile design) help or hinder their learning?
10. How did the DRP that is practiced by you (and other students of textile design) help or hinder their creativity?
11. What are the common problems you (and other students) faced in the application of DRP

12. Do technology and training are the problems for you with the notion of DRP?
13. If Yes! (Q,12) How could it be handled?
14. How could DRP be used more productively, in your opinion?
15. Is there any other aspect (other than mentioned above) which is affected by DRP?
16. How you define creativity particularly related to textile design
17. Do you have a plan to use DRP in other courses of design?
18. What is the major problem or challenge in the implementation of DRP in the curriculum of textile design?
19. How digital reflective practice affect your creativity and creativity of other Pakistani undergraduate students in the textile design studio course?
20. What are the areas in textile design education which improved by the use of the digital reflective practice?

* *This will be a semi-structured interview, so there is a provision to change or evolve questions according to the response.*

Appendix 5: Participant Consent Form

1. Title of Study

Exploring the effect of digital reflective practice on the creativity of textile design undergraduate students: a multiple case study

2. Version Number and Date

Version no 1: dated

3. Invitation Paragraph

You are being invited to participate in a research study. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and feel free to ask us if you would like more information or if there is anything that you do not understand. Please also feel free to discuss this with your friends, relatives and course instructors if you wish. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to.

Thank you for reading this.

4. What is the purpose of the study?

The purpose of the proposed study is to explore the application of digital reflection in undergraduate textile design education. Tools for digital reflection include video recordings, flip videos, time-lapse, and audio commentary.

The objective of the proposed study is to explore the effect of digital reflective practice on the creativity of Pakistani undergraduate students in the textile design studio course. The proposed study also aims to identify the areas which could be improved by the use of the digital reflective practice in the textile design studio course.

5. Why have I been chosen to take part?

I wrote to various universities to seek consent to conduct my proposed study. Four classes comprised of 15 to 25 students each (varied in different institutions) will perform design studio activity (based on DRP) with their course teachers. The selection of the four institutions is based on random sampling. Inclusion of teachers, HoDs, and students is based on purposive sampling. You are Invited to take part in the proposed study because of the following criteria.

University/ College offers an undergraduate program in textile design and accredited by Higher Education Commission Pakistan.

You are the course instructor/Hod/student of the textile design undergraduate program.

You manage, teach or study in online education settings in case of any emergency or unavoidable circumstances (i.e., lockdown)

6. Do I have to take part?

Participation will be voluntary and the participants are free to withdraw their participation at any time, without explanation, and without incurring a disadvantage.

You have a right to decline or discontinue participation at any time, and It will not affect the professional practice, grades/assessment.

7. What will happen if I take part?

The study will be underpinned by a multiple case study methodology, conducted in four departments of textile design within higher education institutions in Pakistan. For each case study, I will collect data from a pre-determined range of sources, including interviews with course teachers, heads of the departments (HoDs) and students (who experienced DDRP in studio assignment).

I intend to use interviews in the proposed study.

In design studio, the teacher usually gives a task to the students based on the aesthetical or technical problem. Students go through the developmental procedure and interact with teachers and peers in the journey of the progression. The student will use video recordings, flip videos, time-lapse, and audio commentary to perform digital reflection during studio assignments.

I will conduct online interviews with course teachers, HoDs and students. Interviews with the course teacher/instructor will provide feedback about DRP and design development. Interaction with the course teacher/instructor will be once in two weeks. In textile design studio course, instructor interact with students on weekly basis to deliberate on the development of their designs. Mostly studio assignments are of 4 to 6 weeks duration. I have plan to interact the instructors for at least two assignments. The purpose of the interviews is to discuss problems and possibilities of DRP and its relationship with creativity of students. Another purpose of the instructor's interviews is to identify areas in textile education which could be improved through DRP.

Mutual themes will be extracted from the teacher and researcher discussion about DRP and the existing practice of the textile design studio course. A strategy will be proposed by the teacher on how DRP could be included in performing the studio assignment.

One interview will be conducted with HoD and sample students after the completion of DRP experience in studio class.

8. How will my data be used?

The University processes personal data as part of its research and teaching activities in accordance with the lawful basis of 'public task', and in accordance with the University's purpose of "advancing education, learning and research for the public benefit".

Under UK data protection legislation, the University acts as the Data Controller for personal data collected as part of the University's research. The [Principal Investigator / Supervisor / Dissertation Advisor] acts as the Data Processor for this study, and any queries relating to the handling of your personal data can be sent to **Student Investigator.**

Further information on how your data will be used can be found in the table below.

How will my data be collected?	Online interviews
How will my data be stored?	Cloud storage & personal laptop
How long will my data be stored for?	5 years
What measures are in place to protect the security and confidentiality of my data?	All the data storage tools and devices are password protected.
Will my data be anonymised?	Yes
How will my data be used?	Thematic analysis and coding Descriptive statistics
Who will have access to my data?	Student Investigator / Supervisor
Will my data be archived for use in other research projects in the future?	NO
How will my data be destroyed?	Data will be destroyed by permanently deleting from all the cloud and digital platforms.

In the GDPR the emphasis is on data minimisation, and so personal data should be stored for no longer than is necessary for the purpose for which it is being processed. For research data this would normally be until data has been fully anonymised, which should happen during the course of the project and not just at the end.

For faculty research or doctoral student research, anonymised data should be kept as long as necessary for the purpose of supporting or validating the project's observations, findings or outputs, which should be at least 10 years. Data acquired in Master's programmes will not normally be retained.

9. Expenses and / or payments

The proposed study is based on online interviews. It will not involve any expense or payment to the participants.

10. Are there any risks in taking part?

Communication with the instructors, HoDs and students might be a challenge because whole interaction will be through online tools. To conduct a case study without discommoding other official duties and studies might be challenging for the participants (teachers, HoDs & students).

It might be difficult to convince the relevant faculty member of textile design to change the routine format of a studio class. Possibly, design participants will feel that I am negating the existing way of pedagogy. I will be very conscious and vigilant in discussing the existing pedagogy of their intuition. Some of the ideas might contradict with ideology or policies of the institution, and they are reluctant to be open about critical concepts. In this situation, I will consider anonymity and confidentiality as a critical factor for the involvement of institutions and participants.

Time management could be a challenge in performing digital reflection and data collection process. Students will have to spare some time for digital reflection in their assignments. participants will also need to manage time for online interviews. The proposed project does not involve medical risk, dangerous workplace behaviours, or any financial matter.

11. Are there any benefits in taking part?

Previous studies in different countries identify the positive outcome of digital reflective practice (DRP). Instructors, HoDs and students will be introduced by the idea of DRP and will have a chance to execute it in their existing studio course. Participants will not have any other benefits at the time of participation or in the future.

12. What will happen to the results of the study?

I consider that my existing network will help me to share the results of my study on multiple platforms. I have experience in using multimedia and interactive media to communicate my perspective. I will utilize the digital platform for sharing and feedback for future studies. I have an edge that my research is funded by the Higher education commission Pakistan (HEC). So, I already have a formal platform to present the findings of my study. I have the plan to collaborate with HEC and create a formal proposal for a workshop for different textile & fashion design institutions of Pakistan. I have a plan to publish my proposed study. But I want to clarify that participants will not be identifiable from the results or at any platform.

13. What will happen if I want to stop taking part?

If a participant wants to stop taking part, there will be the following possibilities.

- If an instructor, student or HoD wants to stop taking part, He/she will refuse to interact with the researcher.

Participants can quit from taking part at any stage prior to anonymisation.

14. What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting **Student Investigator .**and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the University's Research Ethics and Integrity Office at ethics@liv.ac.uk. When contacting the Research Ethics and Integrity Office, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.

The University strives to maintain the highest standards of rigour in the processing of your data. However, if you have any concerns about the way in which the University processes your personal data, it is important that you are aware of your right to lodge a complaint with the Information Commissioner's Office by calling (+44) 0303 123 1113.

15. Potential conflicts of interest

The role in the research will be as a collaborator. Before starting the research, I will take formal approval from the competent authority (i.e., HoD/Director). The concerned instructors and students will conduct studio activity, and I will not influence the participant's view in any phase and will never be able to evaluate students during the course.

The collaboration will be voluntary, and it will not involve any benefits from both sides. I will not interact with the students face to face, and the survey will be entirely online. I will not be in a position to influence the point of view of the teacher and HoD/coordinator by any means

16. Who can I contact if I have further questions?

You can contact the following person in case of any query or question.

Student Investigator

Umer Hameed

Contact: +923004486343

umer.hameed@online.liverpool.uc.uk

Contact details of investigatory team

Thesis Supervisor

Dr Mike Mimirinis
mike.mimirinis@online.liverpool.ac.uk

Contact Details of Ethics Committee/ Research Participant Advocate

liverpoolethics@liverpool-online.com

Appendix 6: VPREC Ethical Approval

Dear Umer Hameed	
I am pleased to inform you that the EdD. Virtual Programme Research Ethics Committee (VPREC) has approved your application for ethical approval for your study. Details and conditions of the approval can be found below.	
Sub-Committee:	EdD. Virtual Programme Research Ethics Committee (VPREC)
Review type:	Expedited
PI:	
School:	HLC
Title:	Exploring the effect of digital reflective practice on the creativity of textile design undergraduate students: a multiple case study
First Reviewer:	Dr. Maria Poulou
Second Reviewer:	Dr. Isabel Huet
Other members of the Committee	Dr. Lucilla Crosta
Date of Approval:	15/7/2020
The application was APPROVED subject to the following conditions:	

Conditions		
1	Mandatory	M: All serious adverse events must be reported to the VPREC within 24 hours of their occurrence, via the EdD Thesis Primary Supervisor.

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This approval applies for the duration of the research. If it is proposed to extend the duration of the study as specified in the application form, the Sub-Committee should be notified. If it is proposed to make an amendment to the research, you should notify the Sub-Committee by following the Notice of Amendment procedure outlined at http://www.liv.ac.uk/media/livacuk/researchethics/notice%20of%20amendment.doc.

Where your research includes elements that are not conducted in the UK, approval to proceed is further conditional upon a thorough risk assessment of the site and local permission to carry out the research, including, where such a body exists, local research ethics committee approval. No documentation of local permission is required (a) if the researcher will simply be asking organizations to distribute research invitations on the researcher's behalf, or (b) if the researcher is using only public means to identify/contact participants. When medical, educational, or business records are analysed or used to identify potential research participants, the site needs to explicitly approve access to data for research purposes (even if the researcher normally has access to that data to perform his or her job).

Please note that the approval to proceed depends also on research proposal approval.

Kind regards,

Lucilla Crosta

Chair, EdD. VPREC