What is Information Behaviour in Design? A novel set of information dimensions to understand and capture designerly use and requirements of people information

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**About the Author:** Dr Farnaz Nickpour is a Reader in Inclusive Design & Human Centred Innovation at The University of Liverpool, and the leader of the Inclusive Design Studios in the UK. Her work explores critical and contemporary dimensions of design for inclusion and human centred innovation, with a core focus on Healthcare and Mobility sectors.

This research addresses lack of holistic and rigorous understanding of designers' information behaviour, through outlining seven dimensions for investigation, analysis, and capture of designers' use and requirements of information within design process. 'Practicing designers' and 'people information' are focused upon. Four initial information dimensions are outlined through analysis and synthesis of literature in Information sciences and Design. These are iteratively evaluated, refined, and detailed through four empirical studies: interview and questionnaire administered to design companies (N=9); observation of a design team in a real-world design project (N=5); observation of three teams throughout a design competition (N=22); and a survey of designers and design researchers (N=89). A novel set of information dimensions are synthesised including 'Purpose', 'Source', 'Format', 'Content', 'Attributes', 'Stage' and 'Intensity'. Furthermore, practicing designers' people information behaviour is detailed using these seven dimensions. Findings enhance theoretical understanding of information behaviour in design, as well as empirical data on designerly information behaviour.

**Keywords:** information behaviour; practicing designer; designerly; design information; people information; information dimension; design research; design practiceNo: Only a specific set of works are referenced, there are plenty of work done in design and knowledge domains about the information generation, collection and management which are not considered in this article.No: Only a specific set of works are referenced, there are plenty of work done in design and knowledge domains about the information generation, collection and management which are not considered in this articleinformation generation, collection and management

# **Motivation and Scope**

Understanding the user of information is becoming increasingly important when designing and developing information systems, products, and services (Hepworth 2007). This is due to various technological, cultural and socio-political recent shifts, popularising terms such as information society (Atele-Williams and Marsh 2018; Kidd 2007; Webster 2006) and information overload (Hwang and Lin 1999). Hepworth (2007) highlights an increasingly ‘people centred’ versus ‘system centred’ approach to design and development of information systems and products, and clarifies its strong link with the understanding of people information behaviour and how it has evolved.

Furthermore, the increasing volume and diversity of information and its multiple sources; reduced cost; ease of access and sharing; and compromised trust and reliability of user-provided content and sources, highlight issues of information bias, misinformation, disinformation, and information trust (Valenzuela et al. 2019; Atele-Williams and Marsh 2018; Sbaffi and Rowley 2017). Hence, adding to the urgency and significance of study of information behaviour in a complex and constantly evolving context.

## Why Information Behaviour?

The outcome of research into people’s information behaviour could be specifically designed information products, services, tools, strategies, and guidelines related to communication of information. Library and information sciences field is the frontier of research in this area. Computer science, information systems, and engineering have also made major contributions.

Wilson defines information behaviour as “totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use” (1999, p.249). Building on Wilson’s definition, Pettigrew et al. (2001, p.44) suggest a simplified explanation: “How people need, seek, give, and use information in different contexts.” This paper adopts Pettigrew’s definition (2001), and focuses on active (Wilson 1999), occupational (Choo and Auster 1993), and task-oriented (Case 2008) information behaviour that is an act of problem solving.

## Why Design information?

The focus of design studies is on information and knowledge (Bertola and Teixeira 2003), reflecting on design practice and how information is used and shared by designers focused on a particular design problem (Wodehouse and Ion 2010). Figure 1 shows Wodehouse and Ion’s adaption of the widely known DIKW hierarchy (Ackoff 1989) based on Sherdroff’s (1999) classification of ‘location’ and ‘context’ for concept design.



**Figure 1** DIKW hierarchy adapted for Information in the design context (Wodehouse and Ion, 2010)

Designers draw on a significant volume and range of information throughout design process. Interestingly, Shooter et al. (2000) demonstrate the reverse connection between ‘design information’ and ‘design space’ as the former increases throughout the design process and the latter shrinks moving from the fuzzy front end, to a finalised design (Figure 2). They highlight the importance of, and the challenge in, characterising the large volume and diversity of design information in order to “facilitate its capture, cataloguing and retrieval so as to support the design process” (Shooter et al. 2000, p.181).



**Figure 2** Design information development (Shooter et al., 2000)

Design information is generally defined as all the information that is generated, used, referred to, consulted with, or transformed during a design process (Shooter et al. 2000). Lim and Sato (2006) argue that design information includes user studies information, prototype models, and design concepts and scenarios. Shooter et al. (2000) argue design information covers three major types including information on form, function, and behaviour. Li and Ramani (2007, p.138) describe design information as referring to the design “specifications, such as functions, performances, material selections, manufacturing process, environments and so forth”.

As the key driver for design specifications, diversity and richness of design information has a direct impact on defining the end product, as well as stimulating the generative early stages of design process (Westerman and Kaur 2007; Eckert and Stacy 2000). Bouchard et al. (2009) argue the increasing importance of design information is demonstrated by studies of the design process, information processing, design expertise, and sources of inspiration.

## Why a holistic study of information behaviour in design?

Studies of designers’ information behaviour as users of information, are considerably limited in breadth and holistic outlook (Sinder et al. 2016; Dong et al. 2015; Pei et al. 2011). An overview of literature highlights engineering design as the predominant domain. It also highlights an atomistic and disparate approach with a tendency to focus on specific and singular aspects of either the behaviour, or the information itself - rather than focusing on the totality of information behaviour and its multitude of dimensions. Most studies focus on one particular behaviour of designers such as their information generation, collection, management, need, seeking, use, modelling, exchange, or decision making (Eddy et al. 2014; Aurisicchio et al. 2011; Rockwell et al. 2010; Srinivasan et.al. 2008; Lim and sato 2006; Fenves et al. 2005; Bruce et al. 2003). While, others focus on structural attributes of design information such as type, source, format, or tractability (Zhao et al. 2019; Wodehouse and Ion 2012; Panchal and Messer 2011; Ozkaya and Akin 2006; Wong and Sriram 1993).

## Why a set of information dimensions?

A divided and atomistic focus on either behaviour or information, has led to a foundational gap in understanding of designers’ information behaviour as a whole, and a lack of holistic set of dimensions. Hence, the need for an integrated study of information behaviour in design which captures key aspects of information behaviour through a rigorous set of theoretically and empirically informed design dimensions. Through synthesis of literature, the applied and information-oriented language of information behaviour in design could be maintained, while being theoretically informed and enhanced by theories and facets of information behaviour in library and information sciences. A review of nature of design practice, current uptake of design information, and some emerging design trends, identifies further opportunities and challenges for study of information behaviour and dimensions in design.

### *Limited understanding of designerly ways of knowing*

A conventional lack of interest in the study of designers’ information behaviour has been noticeable (Laursen and Hasse 2019). Design as a profession, has been archetypally seen as dealing with, and responsible for, the ‘end product’ rather than ‘process’ (Cross 2006; Lawson 2004). This brings up the notion of ‘Black-Boxing’ (Jones 1970), explaining the lack of knowledge of design process, focus on the ‘input’ and ‘output’, and limited understanding of designers’ information behaviour. The predominant output-centred approach in design is further supported by results demonstrating how designers have a more solution-focused strategy while scientists have a more problem-focused strategy (Lawson 1980). Cross (2006) argues this suggests that designers problem-solve by synthesis while scientists problem-solve by analysis.

### *Emerging design approaches and key role of people information*

New and current design approaches such as Psychologically durable design (Haug 2019); meaning centred design (Giacomin 2017; Verganti 2009); human centred design (Brown, 2009); Emotional design (Yoon et al. 2017; Desmet 2007; Norman 2004); and user-led innovation (Dibben and Bartlett 2001) confirm that over the years design has become increasingly people focused and user centred (Tytyk 2006; Darses and Wolff 2006). These design approaches bring with them a wealth of new and existing ‘people information’ which needs to be effectively communicated to designers (Nickpour and Dong 2010; Nickpour and Dong 2011).

## Scope

In its investigation of information behaviour in design, this study focuses upon certain type of information, design discipline, and level of expertise.

### *People information*

‘People information’ is an increasingly significant type of information used throughout the design process, and is broadly defined as ‘all types of information that help designers better understand people and their context’ spanning marketing, ergonomics, ethnographic, behavioural, and demographic data (Pullin 2009; Nickpour and Dong 2010; Giacomin 2017).

### *Industrial and product design*

Industrial and product design disciplines are focused upon as they incorporate a wide range of people information in the process of designing physical and digital products, experiences, and interactions.

### *Practicing designers*

Student designers and design practitioners demonstrate different needs, attitudes, and criteria when approaching a task, and practicing design (Ahmed 2003; Self et al. 2014). As key users of information in the real-world, practicing designers are focused upon in this research.

**Aim and Methodology**

## Research Aim

The study aims to provide a robust structure for investigation and analysis of information behaviour in design and to detail those identified aspects of designers’ information behaviour throughout a design process. The research objectives are threefold:

- To develop a set of dimensions for better understanding of information behaviour in design

- To evaluate and refine the dimensions

- To detail the dimensions throughout the design process

## Research Methodology

General elements of DRM (Blessing et al. 2009), and Case’s stages of research process (2008) were adopted and Robson’s (2016) research methodology was implemented to specify data collection and analysis methods. The study adopted a convergent methodology (Goodman et al. 2006) through employing a number of qualitative and quantitative research methods (Creswell 2007).

Research triangulation (Robson & McCartan 2016) was adopted in order to enable cross examination (Cheng 2005) of the results of the studies. Distinct and complementary methods of both deductive (literature analysis and synthesis to identify initial information dimensions) and inductive nature (four empirical studies to identify and detail further information dimensions) were employed.

The Systematic Model of Engineering Design by Pahl et al. (2007) was used as the reference and the set of information dimensions was approached as the ‘end product’. Figure 3 shows the adoption and adaption of a design process for development of the set of dimensions.

Conceptual

Design

Detail

Design

Clarification

of the task

Systematic Model of Design Process (Pahl *et al.*, 2007)

Embodiment

Design

Initial

framework

Refinement

Evaluation

Detailing

Iterative Cycle

Information Dimensions

design process

Initial

dimensions

**Figure 3** Adoption and adaption of a design process for the information dimensions

Accordingly, the research started with an illustrative and integrated review of literature. Through analysis and synthesis of literature in both library and information sciences and design fields, an initial set of information dimensions was outlined. These initial dimensions were planned to be revised, evaluated and detailed in an iterative cycle through three complementary studies, i.e. interviews with designers; observations of designers in real-world; and a survey with designers and design researchers. It is argued that mixed methods research provides the best information (Creswell 2007) and further strengthens the validity and reliability of research (Gray 2004). Thus, both qualitative (interview and observation) and quantitative (survey) data was collected through subjective (self-report through interview and survey) as well as objective (participant observation) measures of designers’ practice. Studies also varied in terms of breadth, depth, level of control, scope and generalisability (Henn et al. 2006). Figure 4 and Table 1 present the schematic research methodology, and breakdown of studies and methods, respectively.

Outlining the initial set of dimensions

Evaluating + Revising + Detailing the initial dimensions

Evaluated + Revised + Detailed Dimensions

Literature

Analysis + Synthesis

**Figure 4** Research methodology adopted for this research

**Table 1** Research strategies adopted for this research

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Study 1:**Interview with designers | **Study 2:**Observation of designers | **Study 3:**Observation of designers | **Study 4:**Survey with designers & researchers |
| **Type of research** | Qualitative + Quantitative  | Qualitative | Qualitative | Quantitative +Qualitative |
| **Data collection methods** | Semi-structured interview +Ranking questionnaire | Marginal participant observation +Onlinequestionnaire (multiple-answer questions) | Recognised outsider observation +Online questionnaire (multiple-answer questions) | Online survey(open questions for comments & multiple-answer questions) |
| **Data analysis methods** | Thematic coding +Statistical analysis | Thematic coding | Thematic coding | Statistical analysis + Thematic coding |
| **Number of participants** | N=9 | N=5 (1 team) | N=22 (3 teams) | Refinement: N=89Evaluation: N=89 Detailing: N=66 |

# **Findings & Discussion**

## Literature Analysis and Synthesis

Firstly, an illustrative review of knowledge of information behaviour was carried out in library and information sciences, as the host field. This was in order to lay the theoretical foundation for the study of information behaviour in design. Secondly, an illustrative literature analysis was conducted in the design field. Key literature in both fields was identified via multiple scholarly search engines according to criteria including relevance, key words, number of citations, and year of publication. The identified aspects and facets of information behaviour in the two fields were then synthesised in order to reach an integrated and enhanced set of dimensions to be adopted in the design field.

The literature analysis of more than 40 studies of designers’ information behaviour identified several yet narrow and fragmented attempts at addressing specific information-related characteristics (Nickpour 2017). While reinforcing the significance and value of such investigations, this also highlighted a major gap in holistic knowledge of information behaviour in design. The ‘practice-triggered’ yet not ‘theory-based’ approach in design could be a contributing factor. The information aspects addressed implicitly or explicitly in these studies were collated, coded and merged into an expanded final list (Table A). Adopting Domain and Taxonomic and Process coding (Saldaña 2015), the identified aspects were coded and clustered in three iterative cycles. This resulted in four information dimensions including ‘source’, ‘format’, ‘type’ and ‘attributes’. Table A (available as online supplemented data) shows the three stages of data coding and clustering.

The literature analysis also identified inherently distinctive languages and approaches between design and library and information sciences’ investigation of information behaviour. This was seen as an opportunity to build a rigorous, holistic and integrated set of design information dimensions. Through synthesis of literature, the applied and information-oriented language of information behaviour in design could be maintained, yet theoretically informed and enhanced by the theories and facets of information behaviour in library and information sciences.

Using the thematic coding analysis again, the four identified information dimensions in design field were aligned with the three key facets of information behaviour in library and information sciences (Pettigrew 2001) i.e. information ‘need’, ‘seeking’, and ‘use’. The ‘type’, ‘format’, and ‘attributes’ dimensions were in line with the ‘need’ facet, while the ‘source’ dimension related to ‘seeking’ facet. The ‘format’ dimension was also in line with the ‘seeking’ facet, thus it was located in the borderline between need and seeking facets. However, the ‘use’ facet did not have a parallel in the converged information dimensions for design. Therefore, in synthesising the two sets, ‘use’ was added to the initial set of information dimensions in design. Subsequently, the proposed ‘initial information dimensions’ included five dimensions i.e. ‘type’, ‘format’, ‘source’, ‘attributes’, and ‘use’.

## Interviews with Designers

The first empirical study aimed at evaluating, refining and detailing the initial information dimensions. Nine face-to-face interviews were conducted with experienced practicing designers in UK-based design companies. The companies were selected according to their main area of focus (product and industrial design) and prior experience of working on people centred design briefs. The interviewees had 14 years of experience on average. Ranking questionnaires were also used alongside interview sessions, as a complimentary method.

Semi-structured interviews and ranking questionnaire were conducted. Five dimensions were initially explored and further detailed through identifying sub-dimensions. In addition, designers’ responses to five design support tools representing people information (anthropometric data in specific) were collected, in order to enhance potential findings on designers’ use and preferences of people information. Responses were in form of comments and numerical ranking in order of preference. The criteria for the selection of the five tools was to cover a wide range of sources, formats, content and other attributes including familiarity and accessibility of information (Nickpour and Dong 2011). Anthropometrics is a branch of ergonomics and often regarded as the basis of a designer’s people information (Moggridge 2007), especially when designing physical products. The ‘template approach’ (Robson 2016) adopting a coding and clustering method, was used in order to analyse the qualitative data.

The initial dimensions were evaluated as helpful in structuring and analysing designers’ information behaviour and distinguishing its various dimensions. Three dimensions (source, format, attributes) were detailed and populated, one dimension was refined (use), and one dimension was added (purpose).

The vague and under-defined ‘use’ dimension helped new insights and aspects of information behaviour emerge, not explicitly addressed in the initial dimensions. In response to ‘use’ question, many interviewees provided comments such as “for backing up the design process”, “for inspiration and ideation”, or “for reporting back to client”. These responses were seen to address the question: ‘WHY the information is used’ i.e. ‘purpose’ of use. Hence, ‘Purpose’ was identified as a new dimension to be further explored and included. Moreover, notions such as ‘limited’ and ‘minimal’ in response to ‘use’ question, identified another aspect to information use that could be summarised as level or ‘intensity’ of use. Accordingly, ‘intensity’ replaced ‘use’ dimension, and three sub-dimensions including ‘range’, ‘depth’ and ‘frequency’ (Dahlin et al. 2005) were classified under it.

Findings also detailed and populated the ‘attributes’ dimension. The hierarchy of user experience (Cagan and Vogel 2002) was adopted to structure the identified attributes under ‘usefulness’, 'usability', and 'desirability' categories. Table 2 presents key findings in terms of refinement and detailing of the initial dimensions.

**Table 2** Changes made to dimensions based on Interview Study findings

|  |  |  |
| --- | --- | --- |
| **Dimension**  | **Changes**  | **Result** |
| **Source**  | Detailed | ***Explicit*** - Prototyping, People, Client***Tacit*** - Intuition, Experience, Common sense |
| **Type**  | Unexplored | - |
| **Format**  | Detailed | ***Formal*** - Standards & regulations, Guidelines***Informal*** - Experimental |
| **Attributes** | Detailed | ***Usefulness*** - Availability, Clarity, Reliability, Relevance, Value***Usability*** - Compatibility, Level of detail, Adaptability, Accessibility, Intuitiveness, Simplicity, Ease of Learning***Desirability*** - Flow, Professionalism, Interactivity, Inspiration |
| **Use** | To be refined | Consider level of useIdentified ‘purpose’ as a separate dimension  |
| **Purpose** | Added | - |

## Observation of Designers – two studies

The set of dimensions was refined, evaluated and detailed in a second iterative study. Actual and perceived information behaviour were studied and self-reported through observation and follow-up questionnaire respectively. Two real-world design projects were carefully selected as field studies to reflect a spectrum in terms of type of brief, length and intensity of project, and size of the team.

Observational studies adopted the ‘Marginal Participant’ and ‘Recognised Outsider’ approaches respectively (Zeisel 2006). A combination of fixed and open-ended question types was used in the self-report questionnaires.

Firstly, a healthcare innovation project with strong focus on product design and people information was selected. A core team of five professionals from a design consultancy and a manufacturing firm were commissioned to redesign a specific hospital product. The design process took six months from the initiation phase to delivery of the prototype. The researcher joined the project from the outset, in the capacity of a ‘research partner’, providing people information as requested by the design team. This provided the opportunity to actively observe designers’ information behaviour while not being regarded as an outsider, or influencing the behaviour. Figure 5 shows the real-world context of the project and people information.



**Figure 5** Observation as one main source of people information in the Discover stage of the healthcare innovation project – nurse cleaning a commode and bedside chair in a hospital ward

The second observational study included observation of three teams of designers responding to a design challenge. The competition was aimed at professional designers and had a core focus on people centred and inclusive design process. The challenge had a fast and intense 24-hour format. Three teams of designers were observed during the 24-hour challenge. Each team had between five to seven members. Altogether, 22 designers working in three teams were observed for a period of 17 hours. Figure 6 shows the Develop stage of one team’s design process.



**Figure 6** Team A - Concept development stage, 24-hour Challenge

Use of six information dimensions helped create a holistic yet detailed picture and facilitated investigation, analysis and reflection on people information behaviour in both the healthcare design project and 24-hour design challenge.

The new ‘intensity’ dimension was detailed throughout the two observational studies using a seven-point semantic differential scale (Brace 2004). Findings from the first study, highlighted chronology of design process as one key factor in capturing designers’ information behaviour. It was observed that designers’ requirements and use of people information largely varied depending on stage of the design process. Hence, ‘stage’ was identified as one temporal dimension and consequently, included and detailed as the seventh dimension in the second observational study. The widely adopted (West et al. 2018; Roworth-Stokes 2010) Double Diamond model of Design Process including Discover, Define, Develop, and Deliver (Design Council 2015), was adopted to detail information behaviour in a chronological order.

Domain and taxonomic, and process coding (Saldaña 2015) was used to detail each dimension after each observational study. Key findings from the two observational studies are presented in Table B (available as online supplemented data).

## Survey of Designers and Design researchers

As the third triangulated research method, a web-based survey was conducted with practicing designers and design researchers as two core audiences of the information dimensions. The aim was to refine, evaluate and detail the information dimensions. The online survey was completed by 89 participants (89 participants evaluated and refined, and 66 participants detailed the dimensions).

LinkedIn was used as the online platform to identify and target survey participants. A combination of purposive sampling (Robson 2016) and self-selected methods (Fricker 2008) were used to enhance participation.

Close and open-ended questions, multiple-choice multiple-answer questions, and seven-point semantic differential scale (Brace 2004) were used to design survey questions accordingly. Relevance and accuracy factors were considered to ensure reliable survey design and results (Larossi 2006). Piloting was carried out in two consecutive stages (Larossi 2006) with three design and information sciences experts, and ten design researchers and practitioners respectively. As a result, precision, clarity, wording, type and order of questions, introduction and key definitions, and length of the survey were improved. The final questionnaire was revised to be completed in approximately 20 minutes and consisted of four key section as outlined in Table 3.

**Table 3** Structure of the survey with designers and design researchers

|  |  |
| --- | --- |
| **Section 1** | Introduction to the survey, key definitions and participation incentives  |
| **Section 2** | Evaluation of the set of dimensions and Refinement of dimensions |
| **Section 3** | Detailing the dimensions based on design process stages  |
|  |  A – Discover stage |
|  |  B – Define stage |
|  |  C – Develop stage |
|  |  D – Deliver stage |
| **Section 4**  | General participant information including position, years of experience, willingness for receiving study results, and contact details  |

 Complete response rate for the survey was evaluated as high for web surveys (98.9 % for evaluation and refinement; 73.6 % for detailing). Also, the survey had a very good response rate for email survey administration (56.8 % participation rate of people contacted via email).

Out of the total 89 participants evaluating and refining the set of dimensions, 33 were practicing designers, 33 were design researchers and the remaining 23 were unidentified. Out of the total 66 participants detailing the dimensions, 33 were practicing designers and 33 were design researchers. Coding scheme, statistical analysis and multi-comparisons were main methods of data analysis. Both descriptive and inferential analysis methods were used for statistical analysis of survey results.

‘Validity’, ‘verification’ and overall ‘value’ of the set of dimensions was addressed for evaluation purposes. Overall, the set of dimensions was evaluated as comprehensive and useful, yet complex and requiring further clarity on its purpose. This was expected as the set of dimensions was intended to be primarily evaluated by design researchers rather than practicing designers (while designers were one main group of respondents). Altogether 86.5% of all respondents (N=77) and 75.7% of design researchers (N=25) responded ‘yes’ or ‘maybe’ to validity of the set of dimensions. 89.9% of all respondents (N=80) and 90.9% of design researchers (N=30) responded ‘yes’ or ‘maybe’ to verification question. Approximately 84% of respondents (all respondents N=75; design researchers N=28) responded ‘yes’ or ‘maybe’ to value of the set of dimensions.

Pearson’s Chi-squared test was applied to assess the statistical significance of the results. The overall responses to the validation, verification, and value questions were all statistically significant with p<0.001, p<0.001, and p<0.01 respectively.

‘Relationship between dimensions’; ‘clarity of terminology’; and ‘visual representation’ of the set of dimensions were highlighted as needing refinement.

Six dimensions were detailed and further populated in the survey. Pearson’s Chi-squared test was used for inferential statistical analysis of the results for multiple-choice multiple-answer questions.

The numeric semantic differential scale did not prove fully suitable for quantifying the ‘intensity’ dimension. Also, no specific combination of the three sub-dimensions, could be suggested as an overall assessment of intensity dimension.

Changes made to dimensions based on findings from the survey study are presented in Table C (available as online supplemented data).

**Conclusion and further work**

## Conclusion

The outcomes lead to a verified and refined version of Information Dimensions in Design that includes seven key dimensions (Figure 7). Table 4 compares the four theoretically-informed initial dimensions (identified through analysis and synthesis of literature in Information Sciences and Design fields) to the final set of dimensions, refined, detailed, and evaluated through four empirical studies.

***Purpose*** - Why information is used.
***Source*** - How information is sourced.
***Content -*** What type of information is used.
***Format*** - What representation of information is used.

***Attributes*** - What the qualities of information are.

***Intensity*** - What range and depth of information is used and how frequently.

***Stage*** - When information is used.

Attributes

Type

Purpose

Stage

Source

Format

Intensity

**Figure 7** Refined Design Information Dimensions

**Table 4** Comparison between initial and final set of Information Dimensions in Design

|  |  |  |
| --- | --- | --- |
| **Type** | **Method** | **Set of Information Dimensions**  |
| Theoretically informed | - Literature Analysis & Synthesis(Library & information sciences and Design) (N=40) | **INITIAL**SourceTypeFormatAttributes  |
| Empirically informed | - Interview and questionnaire with  design companies (N=9)- Observation of a design team in  real-world design project (N=5)- Observation of three teams in a  design competition (N=22)- Survey of designers and design  researchers (N=89) | **FINAL**PurposeSourceTypeFormatAttributesIntensityStage |

The outcomes also detail the people information behaviour of practicing designers throughout the design process, as captured through four empirical qualitative and quantitative studies (Table 5).

**Table 5** Practicing Designers’ people information behaviour captured through seven information dimensions - key findings from four qualitative and quantitative studies

|  |  |
| --- | --- |
| **Dimension**  | **Result** |
| **Purpose** | Discover  | *Insight, Inspiration, Empathy****,*** *Information* |
| Define  | *Information, Communication, Insight, Inspiration* |
| Develop | *Evaluation, Confirmation, Information, Communication* |
| Deliver  | *Communication, Confirmation, Evaluation* |
| **Source**  | Discover  | *User research, Intuition, Previous experience, Internet* |
| Define  | *User research, Intuition, Previous stage, Client* |
| Develop | *Previous stages, User research, Other projects, Specialists* |
| Deliver  | *Previous stages, User research, Intuition, Client, Specialist*  |
| **Type**  | Discover  | *Experience & context of use, Needs, Problems, Behaviour* |
| Define  | *Needs, Experience & context of use, Problems, Capabilities* |
| Develop  | *Capability (physical, sensory, cognitive), Experience & context* *of use, Needs, Behaviour* |
| Deliver  | *Needs, Problems, Behaviour, Experience, Emotions* |
| **Format**  | Discover  | *Qualitative, Persona & scenario, Quotes & anecdote, Visual* *& audio[[1]](#footnote-1), Case studies* |
| Define  | *Qualitative, Persona & scenario, Quantitative, Visual & audio* |
| Develop  | *Qualitative, Persona & scenario, Visual & audio, Processed, structured Photographic records* |
| Deliver  | *Qualitative, Photographic records, Processed, Quantitative, Quotes & anecdotes, Written report* |
| **Attributes** | Discover  | *Relevance, Validity & reliability, Clarity, Accessibility* |
| Define  | *Relevance, Validity & reliability, Right level of detail, Importance* |
| Develop  | *Relevance, Accuracy, Validity & reliability, Accessibility, Importance*   |
| Deliver  | *Relevance, Validity & reliability, Clarity, Right level of detail, Simplicity* |
| **Intensity** | Discover  | *Depth 4.18 Range 4.25 Frequency 5.18* |
| Define  | *Depth 5.12 Range 4.10 Frequency 5.09* |
| Develop | *Depth 4.97 Range 3.70 Frequency 4.65* |
| Deliver  | *Depth 3.60 Range 3.75 Frequency 4.00*(on a scale of 1 to 7) |
| **Stage** |  *Discover, Define, Develop, Deliver* |

This extensive piece of research has made three contributions to knowledge; first, it has enhanced the knowledge of information behaviour in the field of design through developing a novel set of information dimensions which is comprehensive, integrated and systematic. Results offer a holistic understanding of the topic and investigate it in its entirety, rather than focusing on either ‘behavioural’ (information needs, retrieval, use, sharing, management, etc.) or ‘informational’ aspects (information type, format, attributes, etc.) which has been archetypal of design studies in this area, in the past.

Second, the research has enhanced understanding of practicing designers’ use and requirements of people information throughout the design process by detailing the seven dimensions of the information. Third, the research could facilitate investigation and communication of design information used by, or aimed at designers.

## Further work

The research findings reflect designers’ existing practices and perspectives in relation to people information behaviour. These do not necessarily equate as most effective or desirable though. This could be further investigated.

A framework focuses on “capturing the variation and dimensionality of a phenomenon with the fewest dimensions” (Miller 2006, p.6). Hence, considered completer and more complex in its explanation. Developing a framework of information behaviour in design based on the seven validated and verified information dimensions and their interrelations, could help further the understanding of this area.

While it was not the aim of this research to focus on discrepancies between designers’ self-reported and observed information behaviour, a further comparative analysis of these two methods could offer further insights.

Certain dimensions such as ‘intensity’ proved more elusive in their nature, hence challenging to be captured and interpreted. Further research could help better understand, scale and assess this dimension.

Most studies of information behaviour provide generalisations of one specific group regardless of their background, level of expertise, etc. Aiming to avoid generalisation, this research specifically focused upon practicing designers and people information. Variants such as a practicing designer’s culture, background, demographics, etc. and their impact on information behaviour could be further investigated.

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1. ‘Visual & audio’ includes: *info-graphics, photographic records, video, audio-oral* [↑](#footnote-ref-1)