LEARNING IN VIRTUAL TEAMS – DISCOVERING BEST PRACTICE

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Abstract

*"…truly effective virtual teams will only be built upon understanding the limitations of virtual working on a human scale and finding ways, both technological and managerial, to overcome them" (*Kimble 2010, p 15).

In online environments, learning occurs as students undertake a range of activities and engage with a variety of resources and with their peers and tutors. In addition, learning teams are employed to foster collaboration and the co-creation of knowledge. However, the body of literature associated with learning teams (LT) indicates that they are not always effective in achieving learning outcomes. Maznevski et al. reminds us that without "…careful structuring, support and attention to processes, virtual teams do not achieve their potential and may not even get off the ground" (Pg.2, 2006). The focus of this paper is to report the provisional findings from a study designed to gather data on students' experiences of working in learning teams, the affordances (and limitations) of current module design principles as well as pedagogical strategies that could enhance effective learning team participation. The principles for working effectively in learning teams and guidance material for students and tutors emerging from the study will also be include in the paper. The two-year project involves postgraduate students undertaking online programmes offered through a partnership between Laureate and several European Universities. The students are drawn from different parts of the world and professional and cultural arenas. The nature of their studies requires them to 'meet' and interact within a virtual learning environment. Whilst learning teams are an essential component of their learning toolkit anecdotal evidence suggests that the students are not fully conversant with their own role and responsibilities in engaging effectively within them. Although this study has emerged from the immediate need to improve on what Olariu and Aldea (2014) suggest (in their own study) that 25% of virtual teams are not fully effective, it has a potential wider impact beyond the Laureate/Universities partnership.

1 INTRODUCTION

The stimulus for this research arose in response to feedback from both student and faculty working on an online EdD programme, that learning in small teams is more challenging when compared with whole class discussion forums and other forms of virtual interaction. Many students have reported that the LTs just don't work for them and consequently the learning experience is not as good as it should be. Whilst the cognitive dissonance that results from poorly functioning teams is not entirely without merit as a viable teaching strategy in higher education there are, however, some occasions when they do work seamlessly. Thus, this paper explores what makes the difference by asking the following questions:

a) What do students believe would make their learning team activity more effective and enjoyable?

b) What is the relevance of working with people of different ages, genders, races, cultures, religions, time zones, and educational backgrounds within the same learning team? Does it help or hinder knowledge construction?

c) What do faculty and students suggest are the features of learning teams that most effectively promote productive learning?

d) How do faculty experience the challenges of learning team participation and what solutions do they recommend?

e) How could pedagogical and technological interventions foster more productive learning teams?

Our objectives are to identify and develop:

a) Learning strategies that promote the effective functioning of virtual learning teams.

b) Pedagogical strategies that enhance effective virtual learning team connectedness and collaboration

In addition, we also wish to:

c) Identify similarities and variations within and between Online Laureate programs in forming and sustaining effective virtual learning teams

d) Develop and propose pedagogical and administrative action strategies and processes to deal with and resolve conflicts and other challenges that can occur in virtual learning teams

The study will help us to determine the elements important in forming groups that turn into effective learning teams. In addition, we will identify module design and pedagogical strategies that support faculty facilitation of effective learning teams. As a result, we will be able to provide a tool with guidelines on processes of forming and sustaining effective collaboration in learning teams in different programs. The tool will be piloted and evaluated by the researchers before adoption by different programs. We intend to develop a learning design toolkit and / or MOOC for Learning Teams from both student and faculty perspectives. This course will last 3 weeks and adopt the mass online pedagogical strategies of MOOCs to present our findings as rich interactive media, engaging participants in reflection, discussion and collaborative activities. Participants will thereby have the opportunity to experience first-hand the effective strategies for learning teams that result from the project. The Education Doctorate has two distinct elements, a taught and a thesis stage. It is the former in which the use of learning teams are employed widely as a learning and teaching tool. In particular in the final three modules (of nine) of this stage, they are a key activity. For the purposes of this work an online LT is defined as a small group of students (up to a maximum of 5) who are generally allocated by a tutor to work together on tasks that require the application of key concepts, knowledge and skills.

2   LITERATURE REVIEW

The theories underpinning the use of learning teams in education are those of constructivism, social learning and connectivism. Constructivism views learning as an active process through which students' can deepen their learning experience and foster their critical thinking (Gomez et al. 2010, Alden 2011, Volkov & Volkov 2015). Since a learning team does not exist in a vacuum (Vangrieken et al. 2016) social learning theory recognises that learning is affected by interaction and collaboration (Ayoko et al. 2012; Andersen & Ponti 2104). The use of learning teams in the delivery of online modules is essential since it is through these that deep learning may be readily experienced. However, the online context brings special challenges. Maznevski et al. (2006) contends that technology, in comparison with the face-to-face context has lower richness and social presence. Team members lose information they are accustomed to relying upon. This can lead to misinterpretations, unfounded stereotypes and misunderstandings. Most communications over technology take place with a lag time between one message being sent and another received. This has the effect of reducing the immediacy and efficacy of feedback. Nevertheless, the benefits appear to outweigh the challenges. Maznevski et al (2006) claim that the feedback delay also gives participants time to reflect on their response. Alden (2011) asserts that within a properly functioning learning team, new ideas are rarely accepted at face value but rather students can challenge and explore them in order to tease out underlying meanings, in a mutually helpful manner, so that they can be applied to existing knowledge (Davidson & Major 2014; Hsiung et al. 2014). Alden (2011) further suggests that this can be charecterised as the wisdom of crowds and emphasises that it is through this type of experience that students learn more together than they would do individually. Connectivism is a learning theory that acknowledges the impact of technology on human interaction within virtual spaces (Siemens, 2005). The principles of connectivism include the notion that diverse options enhance learning and that connections are important in technologically enhanced learning environments (Siemens, 2005). This theory implies that the different perspectives students bring and the social connections they make help to influence their learning. Hence the importance of the need to form effective learning teams. Furthermore, learning team activity requires the students to develop transferable skills such as negotiation; collaboration; and working with others across cultural borders, time zones, in a geographically dispersed group (Ayoko et al. 2012; Vuopala et al. 2015), all of which are welcomed by employers in the 21st century. The mere act of putting people together and calling it a learning team clearly does not guarantee that learning will take place (Vangrieken et al. 2016). Maznevski et.al. observes that those setting up learning teams cannot "…simply create high-performance by assigning members and 'letting them run'. Without careful structuring, support and attention to processes, virtual

teams do not achieve their potential and may not even get off the ground" (2006, Pg. 2). A number of key researchers identify the attributes that must be in place in order for learning teams to fully function. Sharing which is supportive, respectful, inclusive and trusting, thereby developing group cohesion, is deemed essential. Interdependence and democracy are also considered to be part of the sharing process (Breen 2013, Volkov & Volkov 2015; Vangrieken et al. 2016). This necessitates sharing learning beliefs and uncovering basic underlying assumptions so that individuals who are members of a maturing learning team can move forward to greater cohesion, develop trust in one another, foster interdependence and a team spirit (Andersen & Ponti 2014; Dimas et al. 2015; Aydin & Gumus 2016; Vangrieken et al. 2016). Dimas et al. (2015: p 141) neatly encapsulates all these points when they state that the "…sharing of positive assumptions, values and rules about learning within the team is an important individual driver and a significant motivational force, which consequently leads to an increase in team effectiveness." Other attributes that characterise an effective LT are co-reflection which can lead to deeper understanding and co-construction of knowledge (where shared meaning and interpretation is synthesised) in order to encourage higher order learning (Breen 2013). Breen (2013) also identifies conflict resolution as important. This means being able to work through difficulties leading to more successful outcomes. The common thread that underpins all these attributes is the formation of an enduring trust that can survive the many highs and lows inevitably experienced in learning teams (Ayoko et al. 2012; Breen 2013; Ku et al. 2013; Volkov & Volkov 2015; Aydin & Gumus 2016; Vangrieken et al. 2016). I

It's clear that the challenges associated with learning teams are not confined to the EdD but appear to be widespread in many different online programmes, regardless of subject area or academic level. Olariu and Aldea (2014) contend that 25% of virtual teams are not fully effective and 18% of virtual team members rated members' performance adequate of below adequate. They have identified three main challenges to overcome: lack of face-to-face contact; lack of resources and time zone differences hindering the ability to collaborate. These challenges present a high-level insight however, it is important to explore these in detail in order to understand the issues. The lists below provide additional details of the challenges facing virtual learning teams and the associated literature sources.

It is by no means exhaustive or in order of priority.

1   Increased possibilities for misunderstandings / conflict due to lack of social connections and emotional cues (Ayoko et al. 2012; Chiong & Jovanovic, 2012; Breen 2013)

2   Destructive conflict (Liu et al. 2008; Hashim & Tan 2015; Raes et al. 2015)

3   Generate high levels of frustration (Breen 2013; Tseng & Yeh 2013)

4   Imbalance in level of commitment from team members (Tseng & Yeh 2013; Hashim & Tan 2015)

5   Questionable behaviours of members including free-riding; hitch-hiking, loafing causing discomfort or annoyance and group tension (Lee et al. 2006 ; Ayoko et al. 2012 ; Tseng & Yeh 2013; Hsiung et al. 2014)

6   Affective conflict and negative emotion – interpreting criticism as personal attack (Ayoko et al. 2012; Hashim & Tan 2015; Vangrieken et al. 2016)

7   Cross-cultural issues (Lee et al. 2006; Olariu and Aldea 2014

8   Work in different time zones (Lee et al. 2006; Olariu and Aldea 2014)

9   Poor course design and pedagogical strategies (Brindley, Walti, & Blaschke, 2009; Swan 2001; Swan, Shen, & Hiltz, 2006.)

It should be noted that for the lifetime of the project an ongoing literature review is being undertaken. Thus far over 700 papers and research publications have been scrutinised. It is important to highlight that affective conflicts are inversely related to the quality of performance and outcome of learning team activity whilst cognitive conflict is viewed as desirable by this type of challenge requires students engage in deeper discussion and thereby achieve a greater understanding of the issues involved (Ayoko et al. 2012). What is missing from the literature is an in-depth understanding of how best to prepare students and faculty to minimise these challenges or indeed how to best mitigate these from escalating during the module. Aydin & Gumus (2016) observe that what little literature there is, it uses a western culture-centric lens. Our research is aimed at bridging that gap.

3   METHODOLOGY

To address the research aims and questions, we used a sequential mixed methods research design. This approach was chosen because it helps to address the research questions from a number of different perspectives. Variation in data collection methods also leads to greater validity (Creswell, et al. 2003a, b). We deliberately integrated the quantitative and qualitative approaches in order to generate new knowledge and a sequential method in order to follow a line of inquiry. We opted for a Sequential Explanatory Mixed Methods Design Strategy (Creswell, 2003) characterised by the collection and analysis of quantitative data followed the same approach applied to qualitative data. Gathering information about students and faculty experiences of the effectiveness of learning teams provides data on what works well and what can be improved. The use of the activity behaviour scale will enable us to identify behaviours that influence learning team collaboration and social connectedness.

As can be seen in Table 1, we employed a mixture of data collection tools including surveys and qualitative focus group and individual interviews to capture both student and faculty perspectives. By using mixed methods and seeking multiple perspectives, we anticipate the development of specific learning and pedagogical strategies, processes and procedures, which, would then be implemented and evaluated for their efficacy.

Table 1 Alignment of aims and research questions to data collection instruments.

Aim	Research Question	Instruments
To identify similarities and variations within and between Online Laureate programs in forming and sustaining effective virtual learning teams	What do students believe would make their learning team activity more effective and enjoyable?	Survey
	What is the relevance of working with people of different ages, genders, races, cultures, religions, time zones, and educational backgrounds within the same learning team? Does it help or hinder knowledge construction?	Survey
	How do faculty experience the challenges of learning team participation and what solutions do they recommend?	Survey
To identify and develop learning strategies that promote the effective functioning of virtual learning teams	What do students believe would make their learning team activity more effective and enjoyable?	Survey Online Focus Group Interviews
	How do faculty experience the challenges of learning team participation and what solutions do they recommend?	Survey Online Focus Group Interviews
To identify and develop pedagogical strategies that enhance effective virtual learning team connectedness and collaboration	What do students believe would make their learning team activity more effective and enjoyable?	Literature Review Evidence from Community of Inquiry Project Laureate funded research Evidence from Belongingness Project Laureate funded research Evidence from a case study of online students' affective responses to technology Project Laureate funded research Validation Tool delivered online to online students and faculty across the Doctorate. and a minimum of 4 Online Masters Degree programmes
	How do faculty experience the challenges of learning team participation and what solutions do they recommend?	
To develop and propose pedagogical and administrative action strategies and processes to deal with and resolve conflicts and other challenges that can occur in virtual learning teams	What do faculty and students suggest are the features of learning teams that most effectively promote productive learning? How could pedagogical and technological interventions foster more productive learning teams?	

Survey data analysis is subject to both descriptive and inferential statistical analysis. Qualitative interview data is to be thematically analysed using NVivo as a data management tool.

The validation of research findings is at the heart of establishing validity and credibility. Member validation involves participants reading the research findings and indicating if these are true to their own experience. If participants endorse the findings, this validates the research team's interpretation, increases the confidence in the data and verifies the information. Member validation will not take place until after the data are analysed and thereby avoiding the fear of influencing participants and thus altering their future behaviour. External validation will be achieved through the recruitment of students and faculty in other Laureate online programmes than those studied during the work packages. This is to test how valid the results are with those who are outside of the main research group. Various tools will be used used to support the verification procedure incliding a survey and onlibne discussion forums.

4   RESULTS

The project started very late in 2016 and is scheduled to run until January 2019. It is split into two distinct phases. The team have completed most of Phase 1, which involves:

1   Modification and pilot testing of quantitative data collection tools based on previously validated surveys and instruments.

2   Pre-test study (Phase 1a) using EdD students from Module 3: Baseline observation of Learning Team communication with BlackBoard; Baseline measurement using tools form above.

3   Modification and pilot testing of quantitative data collection tools based on previously validated surveys / instruments.

4   Survey students and faculty across two partnership universities to ascertain the detail and extent of challenges in online learning teams in these Laureate suite of programmes.

5   Development of learning strategies and processes aimed at making learning team activity more effective.

The student survey (4) and possible methods of making learning teams more effective (5)

The following documents encapsulate the thinking of the researchers to date on how to facilitate effective learning teams. They were created as a result of the ongoing literature review and activities 1,2 and 3.

a)   Student Guidelines - Learning Team Work

b)   Tips on successful learning team working – for students

c)   Tutor Guidelines - Learning Team Work

Central to all three documents is the notion of introducing a learning team agreement or contract. The student survey was designed in part to test the efficacy of this approach. The survey respondents were drawn mainly from the middle part of the taught element of one programme and were predominately native English speakers. Learning teams were a significant feature of their programme. Females outnumbered males two to one. Students were asked to respond to a number of questions including the three detailed below:

	Please tell us about your learning team agreement	Yes	No	N/A
1	The learning team agreement contributed to the success of our team functioning	43.75%	25.00%	31.25%
2	The learning team agreement helped to clarify team goals and objectives	50.00%	18.75%	31.25%
3	As a result of the learning team agreement, we developed and agreed 'ground rules'	37.50%	31.25%	31.25%
4	All team members adhered to the ground rules	31.25%	31.25%	37.50%
5	The learning team agreement helped to increase participation from all team members	37.50%	31.25%	31.25%
6	The learning team agreement helped to decrease 'last-minute' contributions	20.00%	46.67%	33.33%

7	The learning team agreement helped to decrease 'social-loafing'	31.25%	25.00%	43.75%
8	The learning team agreement created a sense of individual accountability	37.50%	25.00%	37.50%
9	We did not prepare or agree a learning team agreement	53.33%	33.33%	13.33%

	Please tell us about your work in learning teams	Agree	Disagree	Neither
1	I contributed a lot to learning team working	75 %	0.00%	25.00%
2	I made meaningful and productive contributions	87.5%	0.00%	12.50%
3	I actively sought others' input, listened well and spoke respectfully to others	81.25%	12.50%	6.25%
4	I got to know my learning team members which helped team development and performance.	62.50%	12.50%	25.00%
5	I did not regard the ideas from other team members as worthy of serious consideration	12.5 %	87.5%	0.00%
6	Having a Learning Team Leader worked well.	62.50%	18.75%	31.25%
7	As a learning team we set milestones and communicated our progress	37.5%	25%	37.50%
8	I managed my personal time so I could fulfill my team commitments	87.5%	6.25%	6.25%
9	As a learning team we started learning team work early, allowed time for review, discussion and modification of each other's' contributions	43.75%	37.5%	18.75%
10	I think that my learning team worked successfully	62.50%	25%	12.50%
11	I think the experience with the learning team agreement worked better than without it in previous learning team experiences	18.75%	37.5%	43.75%
12	The learning team agreement had little or no impact on our learning team activities	37.5%	18.75%	43.75%

	Please tell us about how you maintained the relationships	Agree	Disagree	Neither
1	As a Learning Team, we worked hard to establish trust between ourselves	56.25%	18.75%	25.00%
2	We always treated each other with respect	87.5%	6.25%	6.25%
3	We were supportive of another	75%	6.67%	13.33%
4	We tried hard to understand others' perspectives, needs and motivations	81.25%	6.25%	12.50%
5	I helped a teammate when needed and did not feel 'put upon'	75%	0.00%	25.00%
6	We encouraged each other through understanding, praise and appreciation	68.75%	12.5%	18.75%
7	Generally, there was a good level of receiving feedback from team members	62.5%	25%	12.50%
8	We offered each other constructive feedback rather than complaining /criticizing	75%	12.50%	12.50%
9	I felt that team members valued my contributions	68.75%	18.75%	12.50%

From this data we can provisionally conclude that although a learning team agreement or contract played a part in the learning team experience however for about half the recipients it was not a central factor. What is more likely is that cohort were experienced in managing the challenges associated with making learning teams effective such as treating participants with respect and offering constructive feedback. These features correspond with the advice offered to students in the material (a, b and c) prepared by the team.

We are currently interviewing students and faculty to capture more in-depth information surrounding the use of tools that we have developed. We hope that this will provide us with more detail as to

whether they facilitate the process of working in a learning team and how they could be strengthened. Once the interviews have been thematically analysed we will attempt to validate the tools across a range of modules. Furthermore, we will develop a MOOC to provide students with an additional opportunity to engage in learning about how to operate successfully within a learning team. We anticipate that the MOOC will be used in the induction /orientation phase prior to commencement of modules thereby providing students with a solid base from which to develop their learning team interactions with their peers.

REFERENCES

[1] Alden J. Assessment of Individual Student Performance in Online Team Projects. Online Learning. 2011;15(3).

[2] Andersen R, Ponti M. Participatory pedagogy in an open educational course: challenges and opportunities. Distance Education.2014Apr;35(2):234–49.

[3] Aydin IE, Gumus S. Sense Of Classroom Community And Team Development Process In Online Learning. Turkish Online Journal of Distance Education. 2016 Jan.

[4] Ayoko OB, Konrad AM, Boyle MV. Online work: Managing conflict and emotions for performance in virtual teams. European Management Journal. 2012;30(2):156–74.

[5] Breen H. Virtual Collaboration in the Online Educational Setting: A Concept Analysis. Nursing Forum. 2013;48(4):262–70.

[6] Brindley J, Blaschke LM, Walti C. Creating Effective Collaborative Learning Groups in an Online Environment. The International Review of Research in Open and Distributed Learning. 2009;10(3).

[7] Chiong R, Jovanovic J. Collaborative Learning in Online Study Groups: An Evolutionary Game Theory Perspective. Journal of Information Technology Education: Research. 2012;11.

[8] Creswell, J. W. Research design: Quantitative, qualitative, and mixed methods approaches (2nd ed.). Thousand Oaks, CA: Sage. 2003.

[9] Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), Handbook of mixed methods in social and behavioural research. Thousand Oaks, CA: Sage. 2003: 209–240.

[10] Davidson N, Major CH. Boundary Crossings: Cooperative Learning, Collaborative Learning, and Problem-Based Learning. Journal on Excellence in College Teaching. 2014;25(3&4):7–55.

[11] Dimas ID, Rebelo T, Lourenço PR. Learning conditions, members' motivation and satisfaction: a multilevel analysis. The Learning Organization. 2015Feb;22(2):131–47.Gomez EA, Wu D, Passerini K. Computer-supported team-based learning: The impact of motivation, enjoyment and team contributions on learning outcomes. Computers & Education. 2010;55(1):378–90.

[12] Hashim KF, Tan FB. The mediating role of trust and commitment on members' continuous knowledge sharing intention: A commitment trust theory perspective. International Journal of Information Management. 2015;35(2):145–51.

[13] Hsiung C, Luo L, Chung H. Early identification of ineffective cooperative learning teams. Journal of Computer Assisted Learning. 2014Nov;30(6):534–45.

[14] Kimble C. Building Effective Virtual Teams: How to Overcome the Problems of Trust and Identity in Virtual Teams. Global Business and Organizational Excellence. 2010; 30(2): 6-15.

[15] Ku H-Y, Tseng HW, Akarasriworn C. Collaboration factors, teamwork satisfaction, and student attitudes toward online collaborative learning. Computers in Human Behavior. 2013;29(3):922–9.

[16] Lee S, Bonk C, Magjuka RJ, Su B, Lui X. Understanding the Dimensions of Virtual Teams. International Journal on E-Learning [Internet]. 2006;5(4):507–23. Available from: http://www.editlib.org/p/18927

[17] Liu X, Magjuka RJ, Lee S-H. The effects of cognitive thinking styles, trust, conflict management on online students learning and virtual team performance. British Journal of Educational Technology. 2008;39(5):829–46

[18]   Maznevskii Martha L, Canney Davison S, Jonsen K. Creating effective virtual teams: Getting off the ground. Tomorrow's Challenges [Internet]. 2006 [cited 2016 Feb8]; Available from: http://www.imd.org/research/challenges/upload/creating_effective_virtual_teams.pdf

[19]   Olariu C, Aldea CC. Managing Processes for Virtual Teams – A BPM Approach. Procedia - Social and Behavioral Sciences. 2014;109:380–4.

[20]   Raes E, Boon A, Kyndt E, Dochy F. Measuring team learning behaviours through observing verbal team interaction. Journal of Workplace Learning. 2015;27(7):476–500.

[21]   Siemens, G. Connectivism: Learning theory for the digital age. International Journal of Instructional Technology and Distance Learning, 2005; 2(1).

[22]   Swan K. Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. Distance Education. 2001;22(2):306–31.

[23]   Swan, K., Shen, J., & Hiltz, S.R. Assessment and collaboration in online learning. Journal of Asynchronous Learning Networks, 2006; 10(1), 45-62.

[24]   Tseng HW, Yeh H-T. Team members perceptions of online teamwork learning experiences and building teamwork trust: A qualitative study. Computers & Education. 2013; 63:1–9.

[25]   Vangrieken K, Dochy F, Raes E. Team learning in teacher teams: team entitativity as a bridge between teams-in-theory and teams- European Journal of Psychology of Education. 2016Jun;31(3):275–98.

[26]   Volkov A, Volkov M. Teamwork benefits in tertiary education. Education Training. 2015;57(3):262–78.

[27]   Vuopala E, Hyvönen P, Järvelä S. Interaction forms in successful collaborative learning in virtual learning environments. Active Learning in Higher Education. 2015;17(1):25–38.