

X-Space: A Way Forward? The Perception of Taylor's University Students on Collaborative Learning Spaces

Sheila Yvonne Jayasainan and Hardip Singh Rekhraj

Abstract Technology-enhanced learning spaces are a new trend at universities that are committed to delivering transformational teaching and learning pedagogies. Learning is becoming more social, informal, and less structured. Collaborative learning spaces enable students to harness collective intelligence by engaging in active dialogue and group work, which in turn empowers their peers to create, share, and make beneficial academic contributions that exceed the ordinary classroom experience. This study aims to gauge the perception of students on X-Space classrooms – the collaborative learning spaces at Taylor's University Lakeside Campus. Piaget's constructivism and the theory of motivation guided this research by suggesting the need for students to become stakeholders in their learning. A mixed method of surveys and depth interviews were deployed to examine the effectiveness of X-Space in enriching students' learning experience. The data were analyzed both quantitatively and qualitatively to yield rich and insightful findings. The results indicate that X-Space might be the way forward especially for the kinetic and visual learners. Appropriate recommendations are also provided to boost the effectiveness of collaborative learning spaces and to further encourage students' reception towards this novel classroom mode.

Keywords Collaborative learning • Learner-centered instruction • Technology-enhanced learning spaces • Interactive learning

S.Y. Jayasainan (✉) • H.S. Rekhraj (✉)
School of Communication, Taylor's University, Subang Jaya, Malaysia
e-mail: SheilaYvonne.Jayasainan@taylors.edu.my; HardipSingh.Rekhraj@taylors.edu.my

1 Introduction

1.1 *Learning Is a Social Process*

There is a constant debate on the most effective pedagogical technique to be used in higher levels of education. Some are for imposing knowledge on students, while others suggest that although structures are known within discipline, students are expected to make their own discoveries (Lasley and Ornstein 2000: 20). In higher education, there seems to be a move towards allowing students to be more directly involved in the teaching and learning process. This move is commonly facilitated by technology-enhanced learning spaces, which are a new trend at universities that are committed to delivering transformational teaching and learning pedagogies. Even within the formal classroom setting, educators can move away from the traditionally passive teaching methods and allow for more active engagements with the students. The underlying question is how to motivate students to become stakeholders in their own learning process? This is where a need for collaborative learning environment comes into picture.

Collaborative learning is when students work collectively towards a learning goal that is best realized through the contributions of their fellow peers. More and more programs of higher learning have identified teamwork and collaboration as essential skills set, and having a classroom space tailored for collaboration will enhance students' learning (PR Newswire 2013). Gokhale (1995: 22) defines collaborative learning as "an instructional method in which students at various performance levels work in small groups towards a common goal, and the students are responsible for one another's learning as well as their own." In addition, Bonwell and Eison view collaborative learning as a strategy "that involves students in doing things and thinking about the things they are doing" (1991: 2). These parallel definitions emphasize the active involvement of students in groups that facilitates the construction of their own learning.

Collaborative classrooms allow students' space and flexibility to work in groups within a predefined space. In their respective groups, students may switch between laptops to tablet PCs or handheld devices to view, share, and discuss matters pertinent to their lesson through a fairly large screen that is visible by all group members [e.g., a dedicated television/LCD screen]. To complement this group setup, the educator or facilitator of the discussion has an easy access to the controller that enables group visuals to be projected onto the common screen of the classroom for joint-group viewing and to encourage a deeper discourse.

Learning is social and collaborative requires feedback and interaction among participants, often in breakout groups. (PR Newswire 2013)

These collaborative learning spaces enable students to harness collective intelligence by engaging in active dialogue and group work, which in turn empowers their peers to create, share, and make beneficial academic contributions that surpasses the

ordinary classroom experience. Collaborative classrooms exemplify how physical learning spaces are beginning to adapt to the needs of today's educational needs. This trend also suggests that learning is becoming more social, informal, and less structured.

1.2 Problem Statement

With the advent of new pedagogical techniques and complementary technologies, orthodox teaching methods – passive and instructional – are gradually fading. Today's digital world has led to huge developments in how academic courses at tertiary education institutions are delivered, as more and more educators are adopting new means to captivate minds, engage students, and enhance their teaching ability.

In the context of adapting to technology-based pedagogies, Mason and Rennie (2008) assert that educators are confronted by a serious tension between not wanting to experiment with students and wanting to exploit new and highly flexible ways of making education easier, less rigid, and ultimately more valuable to learners of all ages and all walks of life.

As a result, a new generation of educators and learners is emerging, which will soon phase out the didactic form of instruction, the teacher-centered approach, that is gradually being deemed ineffective in engaging students. Educators today are expected to be less of a repository of knowledge and dispenser of information and more of an active enabler of education, allowing students to become stakeholders in their own learning.

In a new 5-year mission, Taylor's University (TU) aptly recognizes the needs of this new generation of learners and has adopted six strategic thrusts to propel itself as a forerunner in the education sector. One of the six thrusts is to achieve transformational teaching and learning, with emphasis on two key areas: (i) ensuring a conducive and responsive learning environment action plans and (ii) embracing technology action plans (Han et al. 2014). Aligned with the strategic thrusts, X-Space was constructed – future smart classrooms that are currently fully operational. These X-Space classrooms are purposively designed and are flexible formal learning spaces capable of facilitating a diverse learning experience in a highly collaborative and engaging manner (E-Learning Academy 2012).

The technological features and ambience of these smart classrooms complement the learning outcomes and assessment aims of most modules that are offered at Taylor's University. The X-Space design not only allows students to experience the use of technology in their teaching and learning journey but also strives to promote student collaboration, problem-solving, creative thinking, interpersonal communication, and ICT competencies (Han et al. 2014). So, how does this transformational teaching and learning benefit Taylor's University students in terms of its effectiveness and in enhancing their learning experiences?

1.3 Research Questions and Significance of the Study

Empirical research on the effectiveness of collaborative learning at local universities is scarce. There are two studies that are remotely connected to this research – Musa et al. (2011) studied the implications of project-based learning and its impact on language acquisition at the workplace and Han et al. (2014) mainly focuses on the important design factors that make an effective collaborative classroom for teaching and learning. Hence, the absence of learners' feedback and views on the effectiveness of X-Space is a crucial factor that must be considered to fill the aforementioned gap.

The aims of this study are to investigate the extent to which Taylor's University students consider X-Space as an effective learning strategy in enhancing their understanding and to discover their learning experiences by working collaboratively.

The following three questions guided this study:

1. What is TU students' perception on the effectiveness of X-Space teaching-learning strategy?
2. What is the attitude of TU students towards working collaboratively with others?
3. What is TU students' perception on the impact/effectiveness of X-Space classroom on their learning experience?
4. What is TU students' perception on the benefits of X-Space teaching strategy?

1.4 Theoretical Framework

Two (2) theories guided this research. The first is Piaget's constructivism, which emphasized the need for the learner to be actively engaged in their own teaching-learning process. The second is the theory of motivation which suggested that it was not only the instructional style that influenced a students' academic performance but how much that individual wanted to succeed. Both theories suggest the need for students to become stakeholders in their learning.

1.4.1 Constructivism

The word "constructivism" applies both to learning theory and to epistemology – both to how people learn and to the nature of knowledge. It is important to note that constructivism is not a particular pedagogy. In fact, the term refers to the idea that learners construct knowledge for themselves – each learner individually (and socially) constructs meaning – as he or she learns (Hein 1991). This theory suggests that learners construct knowledge out of their experiences.

Learning is an active process in which the learner uses sensory input and construct meaning out of the world. The crucial action of constructing meaning is mental: it happens in the mind. (Hein 1991)

Eggen et al. (2006) opine that constructivism is often associated with pedagogical approaches that promote active learning and facilitate students' lively role or learning by doing (aka discovery learning). They assert that the shift towards students' becoming more content is due to the belief that learners are naturally curious. A student-centered approach should be meaningful, and the most effective form includes activities of "discovery learning" [learning by doing] (Eggen et al. 2006).

In the context of this study, this theory impresses upon the need for students to be allowed to be actively involved in the learning process rather than being solely passive learners. To do this effectively, students must have hands-on experience where they are allowed and encouraged to critically explore their learning environment. This type of instruction allows for long-term retention of knowledge and not merely regurgitation of information.

1.4.2 Motivation

Woolfolk (2007) defines motivation as an internal state that arouses, directs, and maintains behavior. Motivation can either be intrinsic (internal stimuli) or extrinsic (external stimuli). It might be necessary to provide students with incentives for accomplishing tasks, but ideally educators should attempt to nurture students to be intrinsically motivated. Motivation is a key component in learning. Not only does motivation help learning, but it is also essential for learning to take place (Hein 1991).

A major factor that influences students' academic performance is the belief that they can achieve what they set their minds to. Eggen et al. (2006) note that educators facilitate the internationalization process, and they do so effectively by designing learning activities that promote a positive, academic, and cognitive self-concept.

Within the context of this study, the variation in an instructional strategy from a more didactic instruction (teacher-centered approach) to one which is more collaborative learning (student-centered approach) may not in itself result in an increase in academic performance. It is noted that a students' academic performance might not be linked to the method of instruction but to how the student perceives his/her own learning abilities and takes charge to be intrinsically motivated to achieve.

2 Literature Review

2.1 Benefits of Collaborative Learning

Much has been written about the benefits of collaborative learning in terms of its impact on students' interpersonal skills and academic achievement. Many research studies suggest that students learn better when they work interactively with others, and the retention of information is improved through collaborative learning.

Collaborative teams do better in activities that require higher-order thinking and retain information longer than those students who work individually (Johnson and Johnson, cited in Ayon 2013a: 64).

In this approach to learning, students can acquire other skills and knowledge from each other. “The shared learning gives students an opportunity to engage in discussion, take responsibility for their own learning, and thus become critical thinkers” (Gokhale 1995: 22). Gokhale further suggests that critical thinking, one of the vital skills in academic life, can be gained through the collaborative learning interaction via the active exchange of ideas (1995). Kreijns et al. (2003) concurred with Gokhale that collaborative learning leads to critical thinking and also suggested that it can help to achieve a deeper level of learning and a better understanding of the taught lessons.

Collaborative learning can also promote higher-level thinking order. Ingelton et al. (2000: 6) highlight the “improvement in higher-order learning skills through peer collaborations” and list the following skills: discussing, negotiating, interpreting, organizing, applying learning in new situations, clarifying, discarding, redoing, and problem-solving as vital in student-centered learning. When students are in a group, they are more likely to take learning risks and to try new ways of doing and learning, than when they are working individually. Students working collaboratively can cover more ground and get more done than an individual student by sharing references, resources, and ideas (Ingelton et al. 2000).

Not only does collaborative learning impact students’ learning but it can also improve their classroom interaction, social and interpersonal skills. Students learn to be both dependent and independent with the encouragement of sharing of ideas, roles, and resources. Students’ confidence is fostered by projects or tasks “led” by them rather than the educator. Their anxiety about speaking or performing in public is likely to be reduced because of the sustained long-term interaction with others (Ingelton et al. 2000). This is especially vital for students whose second language is English.

According to proponents of collaborative learning, the fact that students are actively exchanging, debating, and negotiating ideas within their groups increases students’ interest in learning (Dooly 2008). Most importantly, by engaging in discussion and taking responsibility for their learning, students are no longer passive in receiving information. Active learning is defined as any instructional method of learning and teaching strategy that ensures the involvement of students in the learning process (Simon, cited in Basher 2010). Through this process of learning, students are provided the opportunity to further their own learning by utilizing their mental faculties while learning in the classroom. The role of the educator is merely to provide an active creation of knowledge in which students play an effective role of building their own knowledge (Basher 2010). Thus, active learning focuses on the mental process of the students and how they implement their own learning. Many believe that active learning stresses on learning through repetition.

2.2 *Attitudes of Students Towards Collaborative Learning*

Students' attitude towards collaborative learning is very critical to the success of the learning process. There have been numerous predictions that students who grow up in the digital age will learn differently and demand a more engaging form of education. One such study by Oblinger and Oblinger (2005: 24) on the "Millennials" or those born from 1982 found that students today gravitate towards group activity and excel academically when learning from pictures, sound, and video, as compared to text. Millennials crave interactivity and have the natural ability to parallel process, and they thrive academically when learning collaboratively.

Additionally, as indicated in the framework, students' success in their academic performance is influenced by motivation, by how much that individual wants to succeed. Ku et al. examined the attitudes of 197 graduate students over 3 years towards online collaborative learning and found that students "favored working collaboratively in online environment" (2013: 928). The majority of these participants believed that collaborative learning environment resulted in a better learning. The researchers found three factors that contributed positively to the students' satisfaction with collaborative learning – team dynamics, team acquaintance, and instructor's support (Ku et al. 2013).

Similarly, Bartle cited in Ayon (2013b) who investigated the attitudes of university-level science students towards group activities and their impact on the students' personal and educational development found that their participants have very positive attitudes towards collaborative learning activities. In addition, participants reveal the importance of developing strong interpersonal skills as they felt that group activities help them develop these skills set (Ayon 2013b).

Choi and Ro (2012) investigated factors that impact the attitudes of the university's hospitality management students towards group projects. Their findings revealed that the students' perception of the project's appropriateness, instructor's support, and fair evaluation led to students' positive attitudes towards group projects (Choi and Ro 2012: 307). The importance of this study lies in highlighting the instructor's role in helping students experience successful group projects hence developing positive attitudes towards such projects.

A successful transition to university is crucial to students' motivation and retention. Research suggests that students engaged in collaborative learning activities are less likely to withdraw as a result of feeling isolated or not feeling wanted. Collaborative learning activities can meet some of the emotional needs of students – needs that are often overlooked in crowded lecture theaters and competitive learning situations (Ingelton et al. 2000). Ingelton et al. (2000: 8) further suggest that collaborative learning groups have the potential to provide students with a natural support system in an environment that they may find overwhelming, uncaring, lovely, or alienating.

2.3 Importance of Collaborative Learning in Preparing Students for the Workplace

Most universities strive to produce graduates who are competent team members, as employers' value people who can work in teams. It is important for graduates to be able to demonstrate to employers that they are team spirited and objective. Collaborative work is part of the daily operation of many organizations, along with collaborative monitoring (Ingelton et al. 2000). Employers look for graduates who are able to motivate themselves and make continuous assessments of their own contributions to a project, as well as those of other team members.

Musa et al. (2011: 194) surveyed 29 randomly selected second-year university students and concluded that project-based learning [which is based on collaborative learning] helped "facilitate the transference and inculcation of workplace-related skills among the participants...such as teamwork, managing conflict, decision-making and communication skills." Besides these skills, they further suggest that participants have become "more independent, confident, and productive in generating and discussing ideas" (Musa et al. 2011: 194).

Besides, Ingelton et al. (2000: 9) state that collaborative learning prepares "students in any discipline for the world of work." They provide a list of skills that are fostered by collaborative learning and that are valued by employers.

Their list includes the following (2000: 10):

- Cognitive skills such as the ability to analyze, evaluate, and synthesize information
- Critical thinking and problem-solving skills
- Numeracy, literacy, and visual communication skills
- Skills in interpersonal understanding with the capacity to communicate effectively and work independently and cooperatively
- A commitment to continuous learning

In essence, collaborative learning can play an essential role in improving students' learning and in preparing graduates to meet the expectations of employers in the workplace.

3 Research Methodology

The study was undertaken using a mixed method of both quantitative and qualitative methods. It consists of a self-completion questionnaire for students and semi-structured depth interviews for students and lecturers.

3.1 Research Design

This was mainly a descriptive study that was conducted to gauge the view of students towards the effectiveness of the newly adopted X-Space classrooms [collaborative learning strategy] at Taylor's University. To ensure accuracy of results, this study was undertaken with a mixed methodology.

The questionnaire technique is a very effective quantitative method that enables large-scale numerical data to be obtained over a short period of time. In this particular study, the researchers wanted to gain numerical data to determine students' views on the effectiveness of X-Space classrooms at Taylor's University and to get a wider picture of the situation across participants by identifying different phenomena among them. The researchers also wanted to explore these phenomena in more depth by using a qualitative technique. This was obtained by semi-structured depth interviews with three selected students and two lecturers whom are currently using these smart learning spaces at Taylor's University. The use of depth interviews is a useful strategy since it enables respondents to give as much detail as possible about their views on the effectiveness of X-Space classroom as a learning strategy, to express their opinions of the impact it has on their learning experiences, and to assess their attitude and behavior towards working collaboratively.

3.2 Participants

Fifty-five participants [50 for survey method and 5 for depth interviews] who were promised confidentiality, anonymity, and non-traceability were purposively sampled from those who are currently using these newly adopted X-Space classrooms at Taylor's University. Results obtained with purposive samples are not generalizable, and the sample is not representative of the population under study; however, it may provide very specific and valuable insights into the research questions under examination (Weerakkody 2009). Participants selected for the survey were of both gender: 15 males (30 %) and 35 females (70 %), and they completed a face-to-face self-completion questionnaire. This type of technique was selected as it has a high response rate (80–85 %) and is useful because it reduces "missing data" in which the respondents leave questions blank or choose the "don't know" response when they do not understand the question (Weerakkody 2009).

The participants selected were also of different programs/majors allowing for a more diverse view on the subject matter from across Taylor's University. Participants selected were 20 business students (40 %), 10 sciences and engineering students (20 %), 10 communication students (20 %), 8 design students (16 %), and 2 education students (4 %).

Weerakkody posits that in a multicultural society, every opinion counts, and the viewpoint of “others” may provide additional insights, points of views, and unusual opinions that can enrich a study (2009: 175). Therefore, in being inclusive of “others,” 12 % (6 participants) were represented by international students, and 88 % (44 participants) were represented by local, Malaysian students.

3.3 *Data Collection Methods*

The use of mixed method for data collection, both quantitative and qualitative, can improve the validity (confirmability) of this research study especially since there is a diversity in the selection of participants.

3.3.1 Self-Completion Questionnaire

This face-to-face self-completion questionnaire consisted of ten items using the Likert scale format with a few open-ended questions. These items were derived from research questions that guided this study. The questions were clear, simple, and specific enough to be understood by the participants.

3.3.2 Semi-structured Depth Interviews

To get a deeper insight on the extent of the effectiveness of X-Space as a learning strategy and to determine its impact on students’ learning experiences, the researchers conducted five semi-structured depth interviews with three students and two lecturers whom are currently using these smart learning spaces at Taylor’s University.

3.4 *Data Analysis Methods*

The data were analyzed both qualitatively and quantitatively. The results of the questionnaire are presented both quantitatively and qualitatively, while the results from the interviews are presented qualitatively. The researcher used thematic analysis for qualitative data. When searching for themes, the researcher looked for repetitions of topics/issues, similarities, and differences between the ways that the participants might have discussed certain issues. The researchers analyzed the quantitative data by looking at the frequencies and percentages of each item on the questionnaire.

4 Findings and Discussion

The findings are presented in terms of themes derived from the analyzed data.

Table 1 TU students’ perception of the effectiveness of X-Space classrooms

| | Strongly agree | Agree | No opinion | Disagree | Strongly disagree | Total |
|---|----------------|-------|------------|----------|-------------------|-------|
| X-Space makes learning easier (%) | 24 | 58 | 14 | 0 | 4 | 100 |
| X-Space enhances Creativity and expression of ideas freely (%) | 34 | 48 | 18 | 0 | 0 | 100 |
| X-Space enhances better understanding and more knowledge gain (%) | 14 | 54 | 26 | 4 | 2 | 100 |

4.1 Effectiveness of X-Space

Based on the data collected from the questionnaire and semi-structured depth interviews, students have a very positive attitude towards the use of X-Space classrooms (collaborative learning) at Taylor’s University (TU) (Table 1).

When students were asked to compare the effectiveness of the X-Space classrooms (learner-centered instruction) to didactic form of instruction (teacher-centered instruction), more than 82 % or 41 students strongly agreed that X-Space classrooms make learning an easier process. Only 2 students or 4 % strongly disagreed, and 7 students or 14 % had no opinion of this statement. The practical design of the classroom, which includes hexagonal shaped tables, movable chairs, and wall-mounted TV display, ensures a certain level of ease and comfort for students to participate in any collaborative activities (Han et al. 2014). Seating arrangements proved to be crucial in students’ learning and participation in the classroom as interview data revealed that students “can share their work easily and can discuss with each other,” and the design of the classroom allows for “freedom to move about and discuss.”

The results also showed that more than 82 % or 41 students strongly agreed that X-Space classrooms enhance their creativity and enable them to express their views freely in class. Only 18 % did not have an opinion of this statement. Chanchalor and Chomphutong (2004) in their study found that more hands-on activities such as problem-based learning actually increased students’ participation and encouraged creativity. Data obtained from the interviews also indicated that students “felt at ease when communicating with their group mates,” and it “enables each group to present their images, discussion points, and arguments for everyone to see.” In examining the responses of participants, there is a significant level of agreement among Taylor’s University students regarding the creativity enhancement through the use of X-Space classrooms (collaborative learning). Lecturers who were interviewed also concurred that class participation has increased as “students are more enthusiastic” by the use of this learner-centered instruction.

Sixty-eight percent or 34 students strongly agreed that X-Space classrooms enhance better understanding of the lessons taught, and students gain more knowledge

in these smart learning spaces. 26 % or 13 students had no opinion of this statement. Only 6 % or 3 students strongly disagreed with this statement. According to Jolliffe (2007), collaborative learning requires students to work together in small groups to support each other to improve their own learning and that of others. This reflects the views that students gain more knowledge and better understanding, as interview data states that it “cultivates a culture where everyone has a chance to present their ideas so improvements/corrections can be made even if students are unsure.” Students will therefore work together to achieve a common goal, and this should in turn result in positive outcomes such as an improvement in students’ academic performance. Students felt a sense of accomplishment when tasks are shared rather than performed independently.

The lecturers interviewed felt that the use of X-Space classrooms are a “good learning strategy” and allows “interactivity” among students whereby “tasks can be set during tutorials,” and the students can “work in groups to gather knowledge and present their views” for “other students to see.” However, they felt that these X-Space classrooms should be utilized for more “mature students” – those undergoing their degree program rather than entry-level program like Foundation Studies. Interview data obtained adds that students undergoing degree-level programs will “benefit more,” and there’s likely to be “more lively discussions” as compared to students in their Foundation Studies. At times, group activities using X-Space classrooms “doesn’t take off effectively” because students are more dependent on the instructor, and they “need a lot more input” from the instructor. It may be a “different experience for degree program students” as they tend to be more independent learners. They are “matured enough to discuss properly,” have more “discipline in their own studies,” and are more likely to “pay attention” during group activities.

The lecturers interviewed also strongly believe that there is “always benefit in traditional learning style” [didactic – instructor-centered instruction]. They further added that students “must have the foundation” in traditional instruction or didactic learning “before they can move into more collaborative learning.” Data obtained from lecturers’ interviews also clearly state that they accepted the usage of X-Space classrooms [collaborative learning] at Taylor’s University as being “a way forward in terms of teaching–learning”; however, “it will definitely be of better value as students grow more advanced” with the use of technology in the classroom.

4.2 Attitude Towards Working Collaboratively

An examination of Table 2 reveals that 48 % or 24 students strongly agreed that they willingly participated in group activities, 40 % (20 students) agreed, 10 % (5 students) had no opinion, and 2 % or 1 student strongly disagreed with this statement. Data obtained from interviews state that students felt that an “X-Space learning is an improvement,” it is “easier to find information from the Internet and incorporate it into group activities,” and the use of X-Space classrooms “makes it easier to discuss with group mates.” As posited in the theory of constructivism, learners construct knowledge for themselves (Hein 1991). This underlines the true essence

Table 2 TU students’ attitude towards working collaboratively

| | Frequency | Percentage | Cumulative percentage |
|-------------------|-----------|------------|-----------------------|
| Strongly agree | 24 | 48 | 48 |
| Agree | 20 | 40 | 88 |
| No opinion | 5 | 10 | 98 |
| Disagree | 0 | 0 | |
| Strongly disagree | 1 | 2 | 100 |

of collaborative learning, in which students would take greater responsibility for their own learning, making them stakeholders of their learning progress.

Additionally, Relan and Gillani (1997:44) reaffirm that the resources of the web, the interactions with other learners, the guidance of the teacher, and the experiences resulting from collaborative activities all combine to effectively distribute the inputs of the course so that the onus shifts to the individual students to construct their own understanding of the topic.

Students enjoy the interactivity presented in working collaboratively using X-Space classrooms as they “don’t feel so bored learning because there’s often an interaction with group mates” compared with the didactic form of instruction in which they feel that it “is more like spoon-feeding,” whereby the educator would “just teach and you merely listen.” Besides, students also felt comfortable in working collaboratively as they “don’t mind sharing their work” with group mates. Students mentioned that X-Space helped the social skills of their “shy friend who never voice out her opinion in class,” but “during the X-Space classroom activity, she actually spoke up her views to us.” This “learning environment really helped her to overcome her shyness and improve her social skills.”

Students are also more “drawn to each other,” and “helping each other” comes naturally during activities. Jolliffe (2007) states that students who work in small groups for a sustained period of time are able to improve their own learning and that of others. Therefore, students essentially learn how to be effective group members by learning how to manage conflicts, while at the same time, learn how to interact with various personalities. This is a useful skill in the workplace environment as Ingelton et al. (2000: 9) assert that skills in interpersonal communication, as well as team-spirited employees, are highly valued by employers.

Students learnt better when working together rather in isolation; there is also an improvement in their social skills since it forces them to practice team and small group communication skills. (Mourtos 1997)

4.3 Impact of X-Space on Students’ Learning Experiences

When students were asked their perception on the impact of X-Space classrooms on their learning experiences, 16 % (8 students) and 58 % (29 students) strongly agree, respectively, that X-Space makes learning easily adaptable for them. 18 % (9 students)

had no opinion of this statement. And 8 % (4 students) disagreed that X-Space makes learning easily adaptable. Interview data revealed that some students found that “it didn’t take long to adapt” the use of X-Space classrooms. Students also stated that they were “surprised by the physical design of the room,” but “after a few classes, they were used to it.” They felt that it “wasn’t hard” to adapt to the use of this new learning environment as the “transition was seamless” for them.

On the other hand, some students revealed that the use of this collaborative learning spaces was a “cultural and technical shock,” and it “took them a month to adapt” to it. They felt that it was “a struggle for almost a month,” and it “was very slow” for them to “present their content effectively” because they are used to the traditional learning method [didactic – instructor-centered instruction]. The technical aspects of the X-Space classroom also posed a difficulty for some students at first instance as they had “difficulty to present points effectively to the screen” and had trouble learning “how to connect the TV display.” It is important to understand that students come to the classrooms with varying degrees of interpersonal, technical, and academic skills. The use of collaborative learning may make introverted students apprehensive because it requires them to communicate verbally, whereby they cannot remain passive or disengaged. It may also cause isolation to some if they are slow to adapt and understand the “know-hows” of using these smart learning spaces.

An examination on Table 3 also revealed that 48 % or 24 students strongly agreed that X-Space promotes more interactive group discussions, 40 % (20 students) agreed, 10 % (5 students) had no opinion, and 2 % or 1 student strongly disagreed with this statement. Based on interview data, all respondents agreed that X-Space creates an “interactive learning environment” for them. Students sensed working closely together, brought “people together,” and instill “closeness” with group mates. This is in line with Roger and Johnson’s (1994) concept of “promotive” interaction – defined as individuals encouraging and facilitating each other’s efforts to achieve, complete tasks, and produce in order to reach the group’s goals.

In an industrial organization, it’s the group effort that counts. There’s really no room for stars in an industrial organization. You need talented people, but they can’t do it alone. They have to have help. (John F. Donnelly, President, Donnelly Mirrors).

Table 3 also illustrates that 48 % (24 students) strongly agreed and 46 % (23 students) agreed that X-Space instills a more enjoyable learning environment for them. 4 % (2 students) had no opinion, while 2 % (1 student) strongly disagree with this statement. All respondents interviewed agreed that X-Space layout is not only “fun and beneficial,” but it also enables students to “share their work with their peers.” The use of X-Space classrooms is “a way forward” in teaching and learning pedagogy as it “cultivates a culture where everyone had to do their fair share” of the work. Roger and Johnson (1994) state that the purpose of collaborative learning groups is to make each member a stronger individual in his or her own right. They further add that individual accountability is the key to ensuring that all group members are, in fact, strengthened by learning cooperatively (1994: 4).

The results further illustrate that 24 % (12 students) strongly agreed and 54 % (27 students) agreed that X-Space enhances better focus in learning. 12 % (6 students) had no opinion, 8 % (4 students) disagreed, and 2 % (1 student) strongly agreed with

Table 3 TU students’ perception of the impact of X-Space classrooms on their learning experiences

| | Strongly agree | Agree | No opinion | Disagree | Strongly disagree | Total |
|--|----------------|-------|------------|----------|-------------------|-------|
| X-Space makes learning easily adaptable (%) | 16 | 58 | 18 | 8 | 0 | 100 |
| X-Space promotes more interactive group discussions (%) | 48 | 40 | 10 | 0 | 2 | 100 |
| X-Space instills a more enjoyable learning environment (%) | 48 | 46 | 4 | 0 | 2 | 100 |
| X-Space enhances better focus in learning (%) | 24 | 54 | 12 | 8 | 2 | 100 |

Table 4 TU students’ perception on the benefits of X-Space

| | Frequency (students were allowed to give more than 1 response) |
|----------------------------|--|
| Interactivity | 36 |
| Technology-savvy | 31 |
| Social skills | 26 |
| Unique learning experience | 25 |
| Innovative | 21 |
| Bonding | 11 |

this statement. Interview data obtained states that students felt that this learning spaces helped them “focus better” as there are “given tasks to work on,” and every member is “responsible for final outcome”; a clear “goal is in sight.” On the other hand, some students felt that X-Space classrooms “easily distract people.” Every student has “their own laptop,” and it is “easy to just not pay attention and lose focus,” while group activities are ongoing (Table 4).

4.4 *Benefits of X-Space on Students’ Learning Experiences*

Based on the analysis of the open-ended questions in the questionnaire, students were asked about their perception on the potential benefits of using the X-Space classroom as a learning strategy at Taylor’s University. The following themes were derived from their responses: students listed “interactivity” (36 students) as the most important benefit followed by being “technology-savvy” (31 students), having commendable “social skills” (26 students), having a “unique learning experience” (25 students), being “innovative” in the classroom (21 students), and having a “bonding” experience with group mates (11 students). This suggests that the majority of students may have positively benefitted from the use of collaborative learning activities practiced at Taylor’s University.

Students also asserted that the use of X-Space classrooms at Taylor's facilitates development of the right job-related skills, namely, working in teams, being flexible, having the ability to interact with diverse groups of individuals, being technology-savvy, and having social and problem-solving skills.

Besides, data obtained from the interviews with lecturers suggest that the most significant benefit of the use of X-Space classrooms is not only the "increase in student participation" within the classroom but also the overall teaching-learning environment has become "more dynamic."

5 Conclusion and Recommendation

The majority of respondents have a positive attitude towards the effectiveness of using collaborative classrooms (X-Space) at Taylor's University. However, the past negative experiences with group work, absence or lack of instructions, and support from the instructors/lecturers contribute to some students' unfavorable disposition towards the use of collaborative learning. In other words, students perceive collaborative learning as helpful as long as their group members are accountable and dependable to complete their learning tasks. Slavin (1988) attests to this by stating that individual accountability and positive interdependence among group members were rife in collaborative learning and as long as the instructors/lecturers maintain good monitoring of the group progress.

Collaborative learning shifts the responsibility for learning to the students as they assume the role of "researcher" and "self-directed" learners. To maximize the potential and benefits of collaborative learning, the instructor must fully understand their students' preferred learning styles and their own conception of learning. This can help the instructors/lecturers to decide where and how to start their collaborative activities that will benefit most students. The result of the study indicates that the use of X-Space classrooms at Taylor's University might be the way forward especially for students who are kinetic and visual learners by enhancing their understanding towards a certain subject.

If we are truly interested in preparing students to be responsible citizens in an increasingly technologically advanced society, then our way of teaching students must reflect this. The projects and activities that instructors/lecturers ask students to take part in should reflect the current and future needs of these learners. Meaningful content in group activities is critical for the success of all students. For students to succeed within their groups, careful consideration regarding group heterogeneity must be given in conjunction with roles that ensure active, equal participation by all students. Creative assessment practices must be developed to document achievement of outcomes for students. All of these considerations require planning and structure in order for the teaching to be successful in X-Space classrooms at Taylor's University.

Wenger (1998: 22) elucidates the importance of modules/courses being designed with collaborative learning principles: "Learning [itself] cannot be designed: it can only be designed for – that is, facilitated or frustrated." The essence of collaborative

learning course design is on the application of activities appropriate to the subject and level of the students. As such, instructors/lecturers should be given ample training to help them in their preparation of these collaborative activities and projects to fully capitalize on engaging students. Merely being taught the technical aspects of X-Space classrooms are inadequate for the success of collaborative learning to take place at Taylor's University.

Students' attitude towards collaborative learning is very critical to the success of this learning approach. Results indicate that students perceive the use of X-Space classrooms as having a positive impact on their learning experiences. However, the researchers found that students would like the inclusion of instructors'/lecturers' support and guidance throughout the learning that is taking place. Students believe that X-Space classrooms are a way forward for TU; however, they are not ready to do away with the role of instructors/lecturers. The study reflects that there is still a need for some didactic form of learning to be used as complimentary to collaborative learning.

The importance of this study lies in highlighting the significant role the instructors'/lecturers' play in helping students' experience successful group activities and projects, hence developing positive attitudes towards the use of X-Space classrooms at TU.

Results suggest that X-Space classrooms as an effective learning strategy can eventually become a cornerstone of Taylor's University, a veritable pioneering selling point to encourage countless students to enroll at the university.

6 Future Research

Future research is recommended to get more insights about students' attitudes towards X-Space classrooms and the impact of this strategy on their learning as well as on their acquisition of job-related skills. It would also be interesting to investigate gender factors, program major, and/or status on students' attitudes towards collaborative learning, their perceptions of learning, and their preparation towards the workplace environment. Further insights could also be derived from the use of another method – an experiment of students in their X-Space classroom environment.

References

- Ayon, N. S. (2013a). Collaborative learning in English for specific purposes courses: Effectiveness and students' attitudes towards it. *American Academic & Scholarly Research Journal Special Issues*, 5(3), 62–67.
- Ayon, N. S. (2013b). Collaborative learning in English for specific purpose (ESP) courses: Effectiveness and students' attitudes towards it. *International Journal of Business & Economic Development*, 1(3), 95–107.
- Basheri, M. (2010). *Collaborative Learning of UML-State diagrams using multi-touch technology*. Durham: Technology Enhanced Learning Research Group. Retrieved July 21, 2014, from https://www.dur.ac.uk/education/research/current_research/tel/technical/

- Bonwell, C., & Eison, J. (1991). *Active learning: Creating excitement in the classroom* (ASHE-ERIC higher education report no. 1). Washington, DC: George Washington University.
- Chanchalor, S., & Chomphutong, P. (2004). Teaching model focus utilizing a student centered strategy for vocational students. *World Transformation of Engineering and Technology Education*, 13(1), 75–78. Retrieved July 30, 2014, from [http://www.wiete.com.au/journals/WTE&TE/Pages/Vol.3,%20No.1%20\(2004\)/16_Chanchalor17.pdf](http://www.wiete.com.au/journals/WTE&TE/Pages/Vol.3,%20No.1%20(2004)/16_Chanchalor17.pdf)
- Choi, Y., & Ro, H. (2012). An empirical study of hospitality management student attitudes toward group projects: Instructional factors and team problems. *Journal of College Teaching & Learning*, 9(4), 303–312.
- Dooly, M. (2008). Constructing knowledge together. In M. Dooly (Ed.), *Telecollaborative language learning: A guidebook to moderating intercultural collaboration online* (pp. 21–45). Bern: Peter Lang.
- EGgen, P., Jacobsen, D., & Kauchak, D. (2006). *Methods for teaching: Promoting student learning in K-12 classrooms*. Upper Saddle River: Prentice-Hall.
- E-Learning Academy. (2012). *X-Space, Taylor's collaborative classrooms*. Retrieved July 25, 2014, from https://portals.taylors.edu.my/portal/eLA/Services_space.htm
- Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education*, 7(1), 22–30.
- Han, A. N. Y., Leong, L. C., & Nair, P. K. (2014). X-Space model: Taylor's University's collaborative classroom design and process. *Procedia – Social and Behavioral Sciences*, 123, 272–279. doi:10.1016/j.sbspro.2014.01.1424.
- Hein, G. (1991, October 15–22). *Constructivist learning theory*. CECA (International Committee of Museum Educators) Conference Jerusalem Israel. Retrieved July 26, 2014, from <http://www.exploratorium.edu/ifi/resources/constructivistlearning.html>
- Ingelton, C., Doube, L., Rogers, T., & Noble, A. (2000). *Leap into....collaborative learning* (Centre for Learning and Professional Development (CLPD)). Adelaide: The University of Adelaide.
- Jolliffe, W. (2007). *Cooperative learning in the classrooms: Putting it into practice*. London: Paul Chapman Publishing (A SAGE Publications Company).
- Krejins, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behavior*, 19(3), 335–353. doi:10.1016/S0747-5632(02)00057-2.
- Ku, H.-Y., Tseng, H. W., & Akarasriworn, C. (2013). Collaboration factors, teamwork satisfaction, and students attitudes towards online learning. *Computers in Human Behavior*, 29, 922–929.
- Lasley, T., & Ornstein, A. (2000). *Strategies for effective teaching* (4th ed.). New York: McGraw Hill.
- Mason, R., & Rennie, F. (2008). *E-learning and social networking handbook*. London: Routledge (the page is viii from the preface chapter).
- Mourtos, N. (1997, January). The nuts and bolts of cooperative learning in engineering. *Journal of Engineering Education*. Retrieved July 30, 2014, from <http://www.engr.sjsu.edu/~nikos/pdf/nikos-cl.pdf>
- Musa, F., Mufti, N., Abdul Latiff, R., & Mohamed Amin, M. (2011). Project-based learning: Promoting meaningful language learning for workplace skills. *Procedia Social and Behavioural Sciences*, 18, 187–195.
- Oblinger, D., & Oblinger, J. (Eds.). (2005). *Educating the net generation*. Boulder: Educause. Retrieved August 19, 2014, from <http://www.educause.edu/ir/library/pdf/PUB7101.pdf>
- PR Newswire. (2013, March 28). *Collaborative classrooms strengthens student learning*. Retrieved June 20, 2014, from <http://www.prnewswire.com/news-releases/collaborative-classroom-strengthens-student-learning-144650375.html>
- Relan, A., & Gillani, B. (1997). Web-based information and the traditional classroom: Similarities and differences. In B. Kahn (Ed.), *Web-based instruction* (pp. 41–46). Englewood Cliffs: Educational Technology.

- Roger, T., & Johnson, D. (1994). An overview of cooperative learning. In J. Thousand, A. Villa, & A. Nevin (Eds), *Creativity and collaborative learning*. Baltimore: Brookes Press. Retrieved July 31, 2014, from http://digsys.upc.es/ed/general/Gasteiz/docs_ac/Johnson_Overview_of_Cooperative_Learning.pdf
- Slavin, R. E. (1988). Cooperative learning and student achievement. *Educational Leadership*, 46(2), 31–33.
- Weerakkody, N. (2009). *Research methods for media and communication*. Melbourne: Oxford University Press Australia & New Zealand.
- Wenger, E. (1998). *Communities-of-practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.
- Woolfolk, A. (2007). *Educational psychology* (10th ed.). New York: Pearson.