Technology-based learning pedagogical strategies

When students undertake TBL, the teacher uses a variety of pedagogical strategies to promote their active involvement. Such pedagogical strategies include blended teaching, blogging, computer surveys, e-mail discussion group, mobile learning, power point presentation, video clips, video games, virtual lab, and you tube.

Blended Teaching

Blended teaching is a combination of classroom discussion and online discussion. Classroom discussion allows face to face interaction between and among students and teachers. Poon, (2012) cited that face-to-face interaction with students is important as students require reassurance and on-going support from teachers. On the other hand, online discussion allows students to be engaged in discussion anytime, anywhere. Both discussions complement each other in order to support and enhance learning.

Likewise, Poon (2012) examined the benefits that blended learning provides to students' learning experience and engagement in property education. Interviews and questionnaire survey were conducted among 442 students in United Kingdom. The interviews were recorded, transcribed and coded to identify similar themes. Findings of the study revealed that both teachers and students find that blended learning gives flexibility for student learning in terms of learning style and study pace. Likewise, it improves students' experience and enhances their engagement.

In another study, Poon (2014), conducted a research comparing the use of blended learning in property education courses in different countries of Australia and UK. Sixteen interviews were recorded, transcribed and coded to identify similar themes. Content analysis was used as a method to analyze

the interview data. Findings of the study revealed that the Australian and UK property academics have similar views on many aspects of blended learning. Their definitions of blended learning are similar as their reasons to use it as a teaching method. The commonly used teaching and learning activities in their blended learning courses in both countries are, again, similar, such as the use of lectures, case studies and guest lecturers. On the other hand, the academics in the two countries face different challenges. A challenge faced by the Australian property academics is to deliver online courses to students who have limited internet downloading capacity and broadband width. Australia is a very large country and has more regional and remote areas. Another challenge faced by the Australian academics is keeping up with the constant introduction of new teaching and learning technology by their universities. On the other hand, the UK academics faced a different challenge, which was to sufficiently engage and encourage students to contribute in online Discussion Boards. The finding is possibly because the UK study was conducted two years prior to the Australian study and the idea of online discussions was relatively new to students at the time. The conclusion drawn from this research is that “ time” and the size of the country influence the use of blended learning.

Likewise, Saghafian and D (2018) studied the phenomenological teamwork in online and face-to-face student teams of MBA programs in Iran. The teamwork experiences of students in each modality have been documented primarily through evaluative research conducted over short spans of time and limited by a priori frameworks. Findings revealed striking commonalities in the experiences of both groups, including a shared desire for effective

leadership to alleviate the problem of free riders, as well as substantial time and effort invested in retaining reliable teammates from one team project to another. Face-to-face participants pursued teammates with similar beliefs about how teamwork should be accomplished while online participants found themselves pre-occupied with staying connected with their teammates and struggled to establish common communication channels with each and every team member. Their findings suggest that while training and support for student teamwork can partly build on the shared needs among students in both modalities, the nature of the experience in each modality may be so different in vital respects that engaging in one mode of teamwork does not necessarily prepare students to participate well in the other mode.

Blogging

The word blog is short for weblog, which in translation means online diary, and is a free website which the user builds, customizes and then posts. Blogging allows students to create an online space through posting, editing, and publishing articles composed of text, images, audio, video, and hyperlinks. It offers opportunities for improving the quality of education to build practical skills necessary to achieve the purpose of learning. Research has indicated that blogs can serve as effective teaching and learning tools to (a) support students' active participation through collaboration in a class, (b) enhance peer support and interaction, (c) increase students' motivation to learn the subject content, and (d) develop students' critical thinking and reflective skills.

Furthermore, a study was conducted by Yu-Chun et al., (2017) to investigate the relationships between learners' blogging self-efficacy, sense of

community, perceived collaborative learning, and perceived learning in classroom environments. Participants were minority adult students enrolled in two courses offered at a university in the southern United States. Results of the study indicated that sense of community and perceived collaborative learning significantly contributed to perceived learning through blogging. Likewise, blogging self-efficacy was not a good predictor of perceived learning but was related to prior experiences of using blogs. Moreover, most students displayed positive attitudes toward the use of blogs and group learning experiences that involved collaborative process as well as the development of knowledge and skills. Furthermore, individual dispositions had a potential influence on collaboration.

Similarly, Ifinedo (2017) conducted a cross-sectional survey about students' perceived impact of learning and satisfaction with blogs from 108 undergraduate students taking a management information systems course. Findings revealed that perceived enjoyment, compatibility, usefulness, ease of use, and confirmation positively influences students' satisfaction with blog use. Likewise, perceived enjoyment had the greatest influence on students' satisfaction with blog use for learning. Moreover, perceived impact on learning was positively influenced by perceived ease of use, enjoyment, and satisfaction.

Computer Surveys

Computer surveys are a quick way to determine what the students have learned about the lesson. SurveyMonkey and Google form are examples that can be used in computer survey. Responses can be true or false, multiple choice, or one word completion questions.

Computer surveys are also known as online survey. Using this pedagogical learning makes the work on surveys faster, cheaper, easier, more accurate, quick to analyze, easy to use, easy to style, more honest, and more selective when compared to traditional survey. This pedagogical strategy enhances students' technological skill.

E-mail Discussion Group

E-mail allows messages to be distributed by electronic means from one computer or any technology user to one or more recipients via a network. Usually, people of common interest form a group where they exchange ideas, hence, called e-mail discussion group or interest groups, mailing lists which are all based on a specific topic. E-mail discussion group is now used in education as a pedagogical strategy where teacher and students form a group which they can name it, add the students and the teacher as members of the group, where they can exchange ideas, and upload articles, videos which are related to the topic. In this way, students can benefit and learn from it anywhere in the world as long as there is internet.

Mobile Learning

Mobile learning involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime and anywhere. Learning can unfold in a variety of ways: people can use mobile devices to access educational resources, connect with others, or create content, both inside and outside classrooms. Mobile learning also encompasses efforts to support broad educational goals such as the effective administration of school systems and improved communication between schools and families.

Through mobile learning, people can do a research. Hatun Atas and Delialioglu (2018) explored the opinions, perceptions and evaluations of students about their experiences with a question-answer system used on mobile devices in a lecture-based course. Basic qualitative research method was employed to understand how students made sense of their experiences during the instruction. The participants of the study were 25 of 42 students enrolled in a Computer Hardware course, who were interviewed in five sessions of focus-groups. Data analysis was done based on the six steps of inductive analysis. The results of the study showed that students mostly ascribed the meaning of their engagement to the observable behaviors about academic challenge. Likewise, concerning inhibiting factor for participating in a lecture, they stressed the constraints of lecture method. On the other hand, concerning inhibiting factor for asking questions, they mostly stated shyness as a reason.

Likewise, mobile phones can help teachers reduce pen and paper during assessment. Robinson (2018) identified technology tools for paperless formative assessment. These are flickers, socrative, quickKey, goFormative, recap, nearpod, and peardeck. For example, during assessment, Robinson (2018) cited that teachers can use multiple-choice questions and review activities and then scan the answer sheets with QuickKey. Students can log on to the teacher’s slide deck with a unique access code, see the presentation on the board and on their mobile devices, and answer interactive questions by dragging, typing, or drawing their responses. Likewise, the document contains each student’s individual answers from the

class session. The teacher can later access this document and provide comments. Moreover, students can use the document as homework review.

Power Point Presentation

Power point presentation is a substitute for chalk and board or the traditional pen and paper posted on the board. Concepts, activities, images, and videos are presented in slide show through a power point presentation. Teacher uses this in teaching. Students can likewise use this during reporting. By using this pedagogical strategy, design skills, technical literacy, and a sense of personal style are developed. It can also be shared to students for them to have access anywhere, anytime by uploading in their group, or can be shared through SMS. This saves time for the students in copying the teachers' lectures, and drawing images in their notebooks. Likewise, teachers benefit from it by saving time and energy because it can be utilized as a tool in teaching anytime, anywhere.

Video Clips

Brooks-Young (2011) suggested using video clips to facilitate learning. According to him it has a " Wow!" factor and if it is carefully selected and judiciously used, video clips support several instructional strategies that enhance the content of the lesson and keep students engaged in learning. However, initial planning time is extended because it takes a while to review and select clips before introducing to the students. But once identified they can be re-used for immediate and future reinforcement.

Smith, Rafeek, Marchan, and Paryag (2012) determined whether the use of video-clips had any impact on students' practical examination results and analyzed students' opinions of this new technology and the perceived impact

on their learning. Twenty-one students completed the questionnaire. There were no statistically significant differences between the practical examination results. It was concluded that video-clips were the preferred method of demonstration of tooth preparations in the preclinical environment. However, students perceived their learning to be facilitated more by one-to-one supervision.

Similarly, Ljubojevic, Vaskovic, Stankovic, and Vaskovic (2014) conducted a study about video clips. They investigated the efficiency of use of supplementary video content in multimedia teaching. Their research presented the effects of the use of supplementary videos with different context of content (entertainment and educational) as well as the effects of their position within the teaching material. Findings of the study revealed that the most efficient method of use of supplementary educational video which is integrated with in the middle of a lecture. This position of video insertion provides the best results. Likewise, the context of video content influences efficiency of learning. Moreover, entertainment video was not as efficient as educational, but it can be used to engage and motivate students for learning.

Video Games

Video game can be used in specific subject areas such as science and can be used as a digital pedagogy like Minecraft. Video games can make learning activities meaningful. For instance, students are asked to produce a travel video for a particular geographic region in the game, to debate the merits of restricting mountain access in a particular region, or to construct an argumentative paragraph about whether hotels should be permitted to

privatize beaches. This shows that video games as a pedagogical strategy is in support of higher-order learning skills.

However, teachers receive little to no pedagogical training on the unique game-based pedagogies that undergird digital game-based learning. Hence, trainings of teachers on game-based learning as an approach to learning should be done.

Moreover researcers investigated the impact of flow (operationalized as heightened challenge and skill), engagement, and immersion on learning in game-based learning environments. The data was gathered through a survey from players (N = 173) of two learning games (Quantum Spectre: N = 134 and Spumone: N = 40). Findings revealed that engagement in the game has a clear positive effect on learning, however, there was no significant effect between immersion in the game and learning. Challenge of the game had a positive effect on learning both directly and via the increased engagement. Being skilled in the game did not affect learning directly but by increasing engagement in the game. Both the challenge of the game and being skilled in the game had a positive effect on both being engaged and immersed in the game. The challenge in the game was an especially strong predictor of learning outcomes. For the design of educational games, the results suggest that the challenge of the game should be able to keep up with the learners growing abilities and learning in order to endorse continued learning in game-based learning environments.

Virtual Lab

The virtual labs are fully interactive simulations in which students perform experiments, collect data, and answer questions to assess their understanding. The labs combine animations, illustrations, and videos to convey key information and engage students in the process of science. Likewise, it helps students learn basic laboratory techniques and practice methods used by lab technicians and researchers in a variety of careers, using specific food science lab processes.

You Tube

You Tube is a website in which subscribers can post their video files. It started as an independent website in 2005 and was acquired by Google in 2006. The slogan of the YouTube website is “ Broadcast Yourself”, which implies that YouTube service is designed primarily for ordinary people who want to publish videos they have created. People use YouTube to post instructional videos, such as step-by-step computer help, do-it-yourself guides, and other how-to videos. Hence, YouTube can be used as a learning pedagogy.

Pecay (2017) conducted a study to generate an understanding of science teachers’ means and motives in using YouTube in their respective classes. Following the principles of phenomenology, Teaching purposes were derived. These established that teachers rely on YouTube respectively to clarify concepts in lessons they find challenging. Likewise, they used it to enhance their science instruction. YouTube then is important especially for non-majors teaching sciences who have difficulty in explaining science concepts.

YouTube videos can explain it for their students. Moreover, designed videos have impact on long-term learning.