



Student-Generated Learning: A Constructivist Approach to Design Engaging Online Learning

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In 2020, higher education educators around the world were obligated by their institutions to move their classes online for the safety of their students and the community around them. Many educators, however, did not have the experience to teach online courses and are faced with challenging situations. For instance, they cannot provide students with an equal amount of attention, especially in large classes, while focusing on delivering the learning content. Educators with a limited eLearning experience might lack the tools and skills to create engaging learning environments. As a result, some students become passive learners and lurkers as they try to survive the instructor-centered or content-centered learning environments. Nonetheless, many researchers argued that implementing student-generated learning (SGL) allows students to actively engage in the learning process (Frisch, Jackson & Murray, 2013; Lazda-Cazers, 2010; Schuenemann & Wagner, 2014). Hence, the aim of this paper is to review the studies that explored the academic and social effects of SGL methodology on higher education students within multiple disciplinary areas in which online tools were used to construct the learning content.

Student-Generated Learning (SGL) Methodology

SGL is rooted in the constructivist theory. Constructivism approaches learning as a product of the mind; there is no one objective reality that learners acquire from an instructor. Rather, constructivists believe that humans learn through interacting with the world to create relevant meaning and to anchor new information with pre-existing ones (Ertmer & Newby, 1993; Jonassen, 1991). Synthesizing new and prior knowledge provides learners with meta-cognitive thinking skills that lead to new perspectives when attempting to solve problems (Ertmer & Newby, 1993). A constructivist-learning environment encourages learners to explore related resources and build their own coherent understanding of the situation in hand. Learning occurs in ill-structured context, which means that data is embedded in the learning content to create a complex learning environment (Medsker & Hold worth, 2001). Thus, in SGL environments, learners acquire the skills needed in the job market such as locating valid resources and constructing innovative solutions.

Effects of SGL on Students' Academic Skills



Multiple studies argued that courses promoting SGL influence student's ability to conduct online search and identify trustworthy resources (Carroll, Diaz, Meiklejohn, Newcomb, & Adkins, 2013; Lazda-Cazers, 2010; Schuenemann & Wagner, 2014). For instance, Schuenemann and Wagner (2014) found that students' blogging activity about climate change and its effects on multiple developing countries enhanced their skills to locate valid information online, cite properly to avoid plagiarism, and present concise information. Similar findings reported by Lazda-Cazers (2010) after conducting an intervention study prompting students to use a wiki collaboratively to generate the learning content for a Germanic Methodology college course. Lazda-Cazers (2010) concluded that toward the end of the course, students learned how to search the Internet for valid resources, cite and paraphrase, avoid bias, and post resources on wiki. Wiki was an ideal medium for this learning context because it fostered collaboration amongst students as they developed the learning content in an authentic environment.

Learning in an authentic environment means immersing learners into ill-structured real-world problems to enable them to use traditional tools and dive deeply to explore the situation is hand (Ertmer & Newby, 1993; Medsker & Holdeworth, 2001). Hence, learners can easily transfer new knowledge to the real-world because learning took place in the same context (Driscoll, 2005). Schuenemann and Wagner (2014) found that students blogging about global warming increased their awareness (54% to 92%) about this issue and its effects on the environment. This finding indicates that immersing students in real-life issues and encouraging them to collect data about critical topics have deeper effects on their attitudes and knowledge, rather than providing them with basic facts about global warming.

Students' Roles in SGL

Students play different roles within SGL environment based on their personalities and communication skills such as leading discussions and connecting with peers (Jimoyiannis et al., 2013). The diversity of the roles influences the development of an active learning community. Take for example the roles of provoker and knowledge generator; the former motivates peers to respond to questions where the later share information and answer questions from peers and the instructor is (Abdullah, Embi & Nordin, 2011). Abdullah et al., (2011) argued that there are two types of roles during online discussions: positive and negative. The positive roles consist of initiating discussions, solving problems, linking and citing valuable information, elaborating and wrapping discussions.

Students with negative roles, on the other hand, read peers' posts passively with rare contributions, flame discussions using inappropriate language, dominate discussions, and lurk

from participating. The negative roles vary in the level of effect they compose on the learning community in general and on individuals in particular. For instance, lurkers can hinder the development of an engaging learning community, while flamers cause other participants to withdraw from the learning community (Abdullah et al., 2011; Jimoyiannis et al., 2013). In addition, students dominating more than 50% of discussions can prevent other members from participating (Abdullah et al., 2011).

Abdullah et al., (2011) argued that many students tend to lurk from participating in online learning during the first weeks due to unfamiliarity with people in the learning community. As students establish their social networking skills, however, their anxiety diminishes, and they start participating. Abdullah et al., (2011) refer to this stage as comfort zone in which students use informal language to address their peers. The presence of lurkers within a learning community might be related to reasons other than social anxiety such as laziness, time constraints, and family responsibilities. Thus, if a student ignored participating in online discussions for a long period, then it is likely that one of the second sets of factors caused his or her attitude (Abdullah et al., 2011). If the learning community is faced with negative participation, the main responsibility relies on the hands of instructor to alter and enhance contributions (Abdullah et al., 2011). Students can also minimize the effect of negative contributions through ignoring offensive comments and encouraging constructive participation. Hence, understanding the factors motivating or hindering students from participating in collaborative learning helps educators with developing successful learning experiences.

Instructor's Roles in SGL

Instructors play an important role in a constructivist learning. They are facilitators motivating learners to take ownership of their learning by defining real-world problems and setting their own objectives (Lazda-Cazers, 2010; Wheeler et al., 2008). The more students feel ownership of the learning process, the more they are motivated to acquire in-depth knowledge and less likely to dropout or lose interest of the subject matter (Mendenhall & Johnson, 2010). Frisch et al. (2013) reached the same conclusion after conducting a study requiring undergraduate students in a biology course to develop scientific questions utilizing Web 2.0 tools. Although the task was challenging for students, they were motivated to learn the skill of developing scientific questions in a student-directed inquiry. Some students formulated their questions around a scientific area not known by the instructor. Accordingly, the instructor encouraged these students to achieve their desired goals and assigned mentors to direct their research. Hence, providing students ownership over their learning elevates their

autonomy in structuring the learning process (Frisch et al., 2013; Kroop, Nussbaumer, & Fruhhman, 2010; Mendenhall & Johnson, 2010).

Providing on-time help for learners (Jimoyiannis et al., 2013; Lazda-Cazers, 2010); guiding them through the learning process; redirecting their questions for deeper coherent understanding (Goh et al., 2014); encouraging them to cooperate with peers; exposing them to different resources and perspectives are characteristics of constructivist instructors (Ertmer & Newby, 1993). However, giving up the strict control of a classroom to allow for more interaction and collaboration among students is not an easy task as suggested by Lazda-Cazers (2010). Therefore, instructors interested in developing a learning community within their classes and engaging students in planning the learning content are encouraged to make a clear statement that this is a learning environment for both students and instructor. This type of statement prepares students for collaboration and encourages them to learn and share new techniques among the class (Wheeler et al., 2008). Moreover, Wheeler et al. (2008) suggested discussing the idea of collaboration and its impacts on students' assignments to ease students' anxiety.

SGL courses require a high-level of class structure and facilitation to eliminate students' possible confusion by the types of assignments (Goh et al., 2014; Lazda-Cazers, 2010). For example, providing a clear list of required assignments that indicates number and length of posts and comments, dividing workload adequately among groups and peers within each group, and establishing a clear grading rubric are basic components to ensure a successful learning experience (Lazda-Cazers, 2010). On the other hand, Jimoyiannis et al. (2013) suggested that the instructor should encourage students to take the responsibility of dividing the workload amongst their group using a guideline that outlines all required elements. Furthermore, assessing students' activities in a collaborative constructivist environment need to be placed around formative assessment rather than summative assessment. The formative assessment motivates learners to enhance their learning process and outcome and encourages them to establish self-regulated skills (Goh et al., 2014).

Utilizing Web 2.0 and Social Media Tools in SGL

Web 2.0 and social media tools provide educators with invaluable opportunity to engage students in developing learning content in a collaborative environment. Frisch et al. (2013) defined Web 2.0 tools as "a suit of technologies that present the participatory approach to using the Internet as a medium for finding, organizing, managing and sharing sources of

information” (p. 70). On the other hand, social media tools are “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan & Haenlein, 2010, p.61). The two definitions suggest that social media tools are part of Web 2.0 tools.

There are multiple online tools that support learners as they build an interactive learning environment around a shared interest. These tools include but are not limited to wikis, social bookmarking and networking sites, Weblogs, podcasts, video repositories, and tagging (Jimoyiannis et al., 2013; Mendenhall & Johnson, 2010; Frisch et al., 2013). The variety of these online tools can be challenging yet motivating for educators who are interested in implementing emerging technologies that support SGL (Mendenhall & Johnson, 2010; Frisch et al., 2013). The online tools can be integrated into a learning management systems (LMS) or used as separate tools to support classroom learning. Munguatosha, Muyinda, & Lubega (2011) survey showed that higher education students are open to accept both ways as long as they are provided with explanation of the benefits of social interaction. Incorporating technology with sound pedagogies to deliver the learning content requires educators to have open minds regarding new trends. Educators are advised to conduct extensive research on the different types of tools, their features, and level of required skills students need to have to effectively utilize an assigned tool (Lazda-Cazers, 2010). In addition, the course learning objectives should be the main component driving tool selection.

Some Web 2.0 tools are more popular than others for supporting student-content development such as wiki, Weblogs, and Google sites. Wiki is a key tool highlighted by many studies to foster collaboration on constructing knowledge and developing cooperative learning projects (Carroll et al., 2013; Lazda-Cazers, R., 2010; Frisch et al., 2013; Rockinson-Szapkiw, Pritchard, McComb-Beverage, & Schellenberg, 2013; Wheeler et al., 2008). Learners use wiki to collaborate on building a learning environment starting by searching for and sharing useful resources, posting text and media, editing and proofreading, and sharing information online (Ryan, Magro, & Sharp, 2011).

Less popular tools, however, can be implemented as sub-applications fostering the process of content development (Frisch et al., 2013). Mendenhall and Johnson (2010) suggested the use of online annotation tools, Adobe Acrobat for example, to promote students' literacy skills. As such, students highlight different types of online text and images, write comments, and invite peers to construct and share their ideas. They found that annotation tools improve students' ability to read comprehensively, think critically, and develop meta-cognitive skills. CiteULike (<http://www.citeulike.org/>) is another example of an innovative Web 2.0 tool that can be used as a medium to help students organize and share online resource,

as well as create a hierarchy list of main and sub resources (Frisch et al., 2013). Educators can require students to use CiteULike as a sub-tool supporting the process of disseminating resources amongst peers.

Technical Support in SGL Environments

Assuming that students in the 21st century already have the knowledge to utilize different learning technologies (e.g. blogs and wikis) is misleading and might place the class in technical problems (Lazda-Cazers, 2010). Thus, instructors applying SGL should discuss the level of technical proficiency with students and encourage them to seek help from the instructor, peers, or technical professional staff if faced with problems (Goh et al., 2014; Jimoyiannis et al., 2013). Goh et al., (2014) and Mendenhall and Johnson (2010) suggested offering students guided training in order to familiarize them with the learning medium at the beginning of the course. The guided training encourages students to explore features of the learning medium and overcome any learning curve they might encounter before starting required assignments. Moreover, starting the class with icebreaker activities has positive influence on students as they build social interaction and trust, which then motivate them to share experience and background knowledge with peers. As students exchange information regarding their experiences, students with superior knowledge on utilizing the learning tool can be identified and contacted should peers need help (Goh et al., 2014).

Learning Activities in SGL Context

SGL environments promote collaboration and communication amongst students and between students and the course instructor to discuss existing information about real-life situations, search for alternative explanations, and establish new perspectives. Accordingly, authentic learning activities in SGL environments foster critical thinking skills that students need to excel in academia and prosper in future career (Goh et al., 2014; Hardy, Bates, Casey, Galloway, Galloway, Kay, Kirsop & McQueen, 2014; Lazda-Cazers, 2010; Schuenemann & Wagner, 2014). The learning activities that support critical thinking skills provoke students to ask in-depth questions, debate different perspectives, defend their own views, and maintain skepticism rather than accepting resources as facts (Goh et al., 2014). Designing learning activities that foster peers' cooperation also affects students' critical thinking ability as they read peer's posts, synthesize, compare and contrast information. The process of sharing information among peers and constructing personal meaning occurs simultaneously within Web 2.0 tools, which feed into enhancing critical thinking skills (Goh et al., 2014). Hence,

instructors are encouraged to select a tool that provides learners with great opportunities to collaborate on constructing projects synchronously and asynchronously based on their preferences.

Students in SGL environments are provided with opportunities to take ownership of their learning through self-directed learning activities (Kroop et al., 2010). In classes with writing assignments, for instance, learners participate in topic discussions, articulate different perspectives, develop persuasive essays, and enhance existing ones. These meta-cognitive learning activities support the development of an active self-regulated learner who starts the class with predefined learning objectives to meet class requirements and then reshape these objectives to feed into self-determined goals. Therefore, it is the role of the instructor to structure the class around learners rather than content and empowers learners to express their goals through flexible learning activities (Kroop et al., 2010).

There are various learning strategies that can be applied in SGL environments to encourage collaboration and critical thinking skills. Goh et al. (2014) argued that implementing Community of Inquiry (COI) in learning environments that utilize Web 2.0 technologies influence students' critical thinking and collaboration skills. As such, students investigate and solve problems using their understanding of information that they share among peers to establish mutual knowledge foundation. Furthermore, COI augment SGL because it fosters interactions among students as they develop meta-cognitive and social skills (Goh et al., 2014).

Similarly, Frisch et al. (2013) found that immersing biology students in a self-directed inquiry-based environment showed significant academic results. Students in their study reported increased knowledge about subject matter, enhanced skills regarding evaluating online resources, and utilizing Web 2.0 tools. The students were able to transfer biology facts into real-world situations by working with peers to create a website illustrating their skills to thoroughly investigate biology related topics using valid online resources. Furthermore, the students were exposed to other groups' websites to expand their knowledge and to learn how to effectively criticize content (Frisch et al., 2013). Nevertheless, it is crucial for educators to define the learning objectives before selecting a learning strategy and align it with optimal tools. Goh et al. (2014) findings suggested that in order to establish a successful learning environment that implements Web 2.0 tools, it is essential for educators to first develop higher order learning outcomes and then design learning content and activities.

Designing SGL Environments

Designing a successful SGL environment using Web 2.0 tools requires careful and thoughtful planning, which can be time consuming for educators. However, the academic and career advantages mentioned previously in the paper are great motivations. Jimoyiannis et al. (2013) illustrated a sample process of designing student-generated learning using a blog as the main medium. The process consisted of five phases. In phase one, instructor prepares students for the learning environment through discussing the learning goals and the assigned individualized and collaborative learning activities. In phase two, students establish familiarization with blog to successfully develop the learning content. The next two phases focus on group-work and the process of acquiring the skills to locate, disseminate, and discuss valid resources among group members to construct knowledge. Finally, in phase five, students wrap-up their group-work and edit the formats to prepare for presentation.

Assessing SGL

Since learners develop their own understanding of the world, instructors in authentic learning environments should not apply a traditional learning assessment, which is based on reinforcement to evaluate the learning outcomes (Jonassen, 1991). Instead, evaluation should be based on assessing the validity of the learning outcomes and students' capability of generating alternative workable solutions (Duffy & Cunningham, 1996). Furthermore, using self-reflection and self and peer evaluation as assessment methods motivate learners to take ownership of the learning process and establish the concept of life-long learning. Asking students to evaluate their learning process motivates them to critically think about their learning progress and whether they developed a new way of knowing. The process of assessing personal learning requires students to approach information with new lenses, which can be challenging at first. However, as students become familiar with self-evaluation, their critical reasoning and argumentation skills improve (Goh, Dexter, & Self, 2014).

Although peer evaluation is a valuable assessment tool in authentic learning environments, Carroll et al. (2013) reported that some students might develop fear and anxiety knowing that their work will be posted publicly for peer evaluation, commenting, and editing. As a result of this fear, students delayed their postings until the actual date of grading to minimize peer evaluation. To address this problem, the instructor provided students with sample postings and conducted a discussion session for students to ask questions and suggest multiple presentation options to compete with students who posted their work early in the semester. The process of modeling and competing improved the writing quality among students, encouraged them to compete on producing innovative pages within wiki, and boosted self-efficiency and satisfaction among students with early posts (Carroll et al., 2013; Jimoyiannis, Tsiotakis, & Roussinos, 2013). Toward the end of the course, students developed

their social communication skills and were motivated to critically comment on peers' work because they accepted the same types of comments on their pages and found them to be constructive. Moreover, through reading and commenting on peers' work, students were exposed to different perspectives on the same topic, which opened their minds to accept new ideas and gain in-depth knowledge (Carroll et al., 2013).

Implementing self and peer evaluation foster students' critical thinking skills, which is a fundamental component in learner-centered environments (Goh et al., 2014; Wheeler, Yeomans & Wheeler, 2008; Wright, Dhanarajan, & Reju, 2009). Hence, measuring students' critical thinking can be accomplished through self and peer evaluation as mentioned earlier and also through the level of online literacy students develop while creating and posting information online.

Conclusion and Future Research

As students' role in higher education is shifting from being passive learners to taking the responsibility of their learning and engaging in the process of constructing knowledge (Johnson, Adams Becker, Estrada, & Freeman, 2014; Lazda-Cazers, 2010), SGL approach provides educators across disciplines the opportunity to empower their students with required skills to take full advantage of this learning environment and overcome any technical, communicational, or academic challenges. In addition, applying Web 2.0 tools to support the establishment of effective learning community elevates students' collaboration and social communication skills as they address the learning activities using creative yet challenging approaches.

With that in mind, there is paucity of research exploring the effects of implementing Web 2.0 tools in higher education, especially in non-westernized cultures such as Saudi Arabia (Ryan et al., 2011; Wheeler et al., 2008) as well as the influence of students' and instructor's roles on the success of learning communities (Deng & Yuen, 2012; Jimoyiannis et al., 2013). There is little known whether individualized students in Saudi Arabian higher education institutions will succeed in a constructivist environment that requires collaboration and communication skills. How would they react to peers' edits and comments; what roles would they embrace as they work in group-projects; would they take the roles of lurkers or peripherals; and how would these roles affect other group-members. Moreover, as higher education institutions are shifting towards providing online learning because of the COVID-19 pandemic, educators need access to best practices to design and develop effective SGL environments across different disciplines.

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