

CONSTRUCTIONIST LEARNING USING TEAM-WORKING AND SOCIAL NETWORKS FOR INFORMATION-TECHNOLOGY STUDENTS IN HIGHER EDUCATION

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ABSTRACT

This study shows how 21st-century models and theories can guide collaborative learning using social media tools in tertiary education. A group development model in conjunction with social, cultural theory and construction and constructivism theory is used to design intellectual creative learning activities through social networks to encourage students to learn. Know how to work as a team and deliver a real learning experience. Students are encouraged to think in part and to be able to interact with members and to exchange knowledge with 46 first-year Thai, information-technology students. Tuckman's group development Its purpose is to assess the effectiveness of the use of models and theories in the design of learning using social media. The results of student satisfaction with the activities were satisfactory. The comparison between pre-and post-test results showed that scores were significantly higher for the post-test.

Keywords: Constructionist, Team-Working, Social Networks, Information-Technology, Education

INTRODUCTION

In general, social media has been described as a disruptive technology in many sectors including that of teaching and learning. This is because the tools move the locus of control away from the teacher and, instead, shift it towards the learners. This shift towards learner-centeredness can be perceived as a positive development. However, students may not always know how to direct their learning in the student-centered contexts of social media use. For this reason, the use of social media in learning calls for more complex learning designs that are based on solid theoretical foundations and that can provide guidance to the learner without taking away the benefits of learner-centeredness that the new online tools offer.

Not surprisingly, therefore, the growth in the use of social media in contexts of learning calls for models and theories that can guide instructional designers and instructors in how best to design and deliver learning with these new learning tools. However, the rapid development of these new tools has outstripped educators' capacity to identify new theories and approaches that can ensure that the tools are used to their capacity and that they maximize learning. Instead of inventing new theories and approaches, educators and designers have explored how learning with new 21st century tools can be guided by theories of learning that existed long before the advent of the Internet. What is needed, therefore, are examples of cases of how 20th-century theories and approaches can be applied to new 21st century learning environments and tools. It is with this need in mind that the study reported on in this paper was conducted. This study provides an example of how 20th-century models and theories can be applied successfully to guide the design and delivery of learning for undergraduate students in higher education using social media tools. The case study drew on the educational psychologist (Tuckman, 1965; Gillies, 2016)). Model of group development socio-cultural theory (Vygotsky, 1978) and theories of constructionism and constructivism. These models

and theories were applied to the design and delivery of learning experiences for 46, first-year Thai, information technology students. The specific objectives addressed by the study were as follows: 1. Design learning experiences using the models and theories and social media 2. Evaluate the level of student's performance with the learning experiences 3. Evaluate students' levels of satisfaction with the learning experiences.

LITERATURE REVIEW

For each of the models and theories in this section, an overview is provided. The models and theories are considered about the design of learning using social media.

Model of Group Development

Model of group development has been “widely recognized in organizational literature (Tuckman, 1965)” Explain that the learning process of learners in particular, in collaboration, there must be support for the exchange and differences of ideas within other people who share similar work and objectives. Want students to participate in problem identification and problem-solving activities. Which has defined the process of team development in 5 steps, namely, Forming, Storming, Norming, Performing, Adjourning, for planning. Synthesis and assessment as well as knowledge of relevant content (Mayer, 2011).

Team-working (Pivec & Maček, 2019) is said to be the exchange of knowledge between members as a means to team success. Achieving the best team performance requires proper knowledge of the application. The use of social networks is one of the key success factors in knowledge management. In particular, the exchange of knowledge between individuals is linked to an individual's willingness to exchange knowledge.

However, the effective exchange of knowledge depends on the exchange behavior of the individual. Lack of knowledge sharing in teams hurts knowledge management. This is an important limitation knowledge sharing is one of the important knowledge management activities. This ensures organizational success and encourages creativity (Al-Jamal, 2013). Additionally, knowledge sharing is an integral part of teams for permanent learning. As it encourages collaboration and the reuse of individual knowledge through data. Technologies and tools such as document management systems, workgroups, and databases have been regarded as knowledge exchange systems in the past. This must be integrated with the addition of people and teams who are learning this system and knowledge exchange requires essential items such as collaboration environments, training, and education (Ivanova, Vinogradova & Zadadaev, 2019). Tuckman's model presents several constraints that Tuckman identified. One of these constraints is related to the fact that his original model involved small group development, in line with the mentioned (Gillies, 2016). That teachers need to plan and organize small groups in such a way that all members of the group understand that they are connected and that no one can succeed unless they work together. Group members are willing to collaborate and help each other's learning to achieve group goals and every student has a contribution and a role to play in promoting the success of the group.

Hong & Lin (2019) Said that this collaborative learning makes students more involved in learning. Because as an individual they also want to exchange ideas as group members and debate. This process will be accomplished in collaboration. Thus, Tuckman's model presented several limitations which Tuckman himself identified. One of these limitations relates to the fact that his model originally pertained to small group development, for example, therapy sessions, and to teamwork can lead to good quality innovation (Chujitarom, 2020). It is for this reason that it is important to apply the model in a variety of settings, such as in this study.

Constructionism and Constructivism

Constructionism builds on Piaget's constructivism to focus attention in the learning process on the construction of meaning as opposed to the transmission of knowledge about constructionism and social media, posited that construction of meaning is best achieved when learners construct external, sharable artifacts (Papert, 1988). As observed, online tools such as "Twitter, Facebook, Instagram, wikis, discussion sites, blogs, and other means" support this construction of meaning and of artifacts (Schrader, 2015). In general, "social media benefits constructivist philosophies and practices" constructionism involves "building knowledge structures" or learning by making. Constructionism contrasts with instructions in terms of the nature of knowledge and how individuals come to know. Constructivist learning is decentralized as learners design artifacts themselves. Constructivism involves an active and interactive process of learning which calls on educators to create learning environments in which learners can engage in such forms of learning (Tuncel & Bahtiyar, 2015) points out that, in constructivist learning, the teacher acts as a facilitator and relies on scaffolding and guidance to help learners actively construct knowledge through solving authentic problems (Alanazi, 2016). In student-centered learning comes from the quest for all students to perform better in their own educational goals (Irer et al., 2017) student-centered learning resource based on constructivist theory. In theory, students learn by connecting new knowledge with old knowledge and ideas. and such skills lead to knowledge literacy and skills that prepare individuals to face challenges and opportunities in the 21st century. Two courses in Indonesia over the past decade require high school students to recognize the importance of cognitive and cognitive processes. (Ledward & Hirata, 2011) and the development of learning styles. Combining knowledge with technology in higher education (Bondar, et al., 2021).

Socio-Cultural Theory

Vygotsky's sociocultural theory focuses attention on the joint construction of meaning that occurs through collaborative dialogue with others who are more expert (Schrader, 2015). Concept of the Zone of Proximal Development (ZPD) (Vygotsky, 1978), the zone or difference between what learners are capable of alone versus with assistance from a more capable other (Schrader, 2015). Perspective on socio-culturalism in learning, particularly in relation to the ZPD, references three planes of learning: apprenticeship, guided participation, and participatory appropriation. In general, sociocultural perspectives are attentive to how learners and teachers interact using the tools and resources available in a given context such as in an online environment (Ahn et al., 2016). Argued that social media expands the reach of socio-cultural theory as well as constructivism by affording more diverse socio-economic, linguistic, and cultural communities to come together (Schrader, 2015). As well, Schrader argues, social media provides a context in which learners serve as experts for other learners as they co-construct knowledge. Argued that the online socio-cultural context *i.e.*, "Who is present in one's network" can influence learning positively or negatively because of issues that can arise with boundary crossing and the need to constantly negotiate practice further observed that correct alignment is important when students are using social media tools (Ahn et al., 2016). Interactive learning environments are important as education is shifting to virtual environments (Kaddoura & Al Hussein, 2021)

Using the interactive learning process, collaboration is possible with the help of computers. Computer-Supported Collaborative Learning (CSCL) is learning through the Internet. Sharing and building knowledge between participants will use social media to communicate or exchange resources. The primary objective of the CSCL environment is to support the exchange of knowledge-building processes that learners recognize in the development of knowledge-social qualifications (Stahl, 2015; Yücel & Usluel, 2016). It is supported by social networks. To help

optimize the learning environment, for example, to facilitate the exchange and distribution of knowledge and expertise among group members. The application of Computer-Supported Collaborative learning is widely supported in educational settings (Wu, 2013) and the use of social media in building success at work (Trawnih et al., 2021).

Using social media is a practical tool for developing a closer relationship with social media use. Reminding individuals about the need to link through algorithms: In this context, individuals who share ideas and ideas develop common interests through social media (Greenhow & Burton, 2011; Quinn et al., 2016). However, key variables were also coupled with trust and life satisfaction when researching university students' use of social media. Self-esteem is an integral part of any social experience online, such as social acceptance. Interpersonal nature interpersonal behavior relationship quality and the continuity of the relationship identifies traits related to the structure that makes humans a social animal (Cameron & Granger 2018; Newton & Zmerli, 2011), and analyzes the self-importance of understanding interpersonal relationships. According to research, the correlation between self-esteem and most interpersonal indicators was low to moderate (Marino et al., 2018).

METHODOLOGY OF RESEARCH

Participants

Participants were 46 undergraduate students in an Information Technology course at a university in Bangkok, Thailand. There were ten such classes at the university in question. The class chosen was one of ten with 46 students proving ethics' consent to participate. Experts for assessing the quality of research were as follows: four associate professors and one assistant professor experienced in team-working and social networks assessed the level of consistency (IOC) and the quality of the assessment forms. Three associate professors and seven assistant professors experienced in educational technology and social media, and in the design of learning for supporting team-working.

Procedures

The study was conducted in three phases. Phase 1 involved applying the theories and model to create learning activities/experiences. This phase was completed using the conceptual framework presented in this paper. It also involved validation of the learning activities by 15 experts. This phase also involved the revision of some of the activities. Phase 2 involved the administration of a pre-test followed by students' use of learning activities. Phase 3 involved the administration of a posttest as well as a satisfaction questionnaire.

Phase	Purpose	Duration in months	Resources
1	Design & create learning activities by using the constructionism approach through online social networks for improving team-working.	6	Conceptual framework and online social media such as wix.com, Facebook, & Line.
2	Implement learning experiences.	2	Pretest and learning experiences with online tools.
3	Assess the learning activities.		Posttest Satisfaction questionnaire.

Tool	# of items	Source	Chronbach's alpha
Learning activity conceptual framework		(Tuckman, 1965; Papert, 1988; Vygotsky, 1978)	...
Pretest/posttest	40	(Delucchi, 2014)	0.867
Satisfaction questionnaire	20	(Korner et al., 2015)	0.857

Data Analysis

Statistical procedures were calculated with SPSS version 17.0. Table 3 shows the corresponding levels associated with the indicators for the satisfaction questionnaire. T-tests were used to calculate levels of significance between the pre and post-test.

Score	Indicator
Excellent	4.51-5.00
Good	3.51-4.50
Satisfactory	2.51-3.50
Poor	1.51-2.50
Failure	1.00-1.50

RESULTS OF RESEARCH

The activities were designed using various social media tools including Wix.com and a website building platform. Students could also make use of social media tools such as Facebook and Line. The line is a free application commonly used in Thailand that operates on smartphones, tablets, and personal computers and that supports features such as chat and sharing.

Members worked in teams and used online media to solve design problems. In this example, students worked together to create online designs for a Mother's Day card.



**FIGURE 1
SAMPLE TEAMWORK ACTIVITY INVOLVING THE CREATION OF A MOTHERS' DAY CARD**

Students could also make use of various forms of social media to communicate with team members.



FIGURE 2
EXAMPLE OF USE OF LINE APPLICATION FOR STUDENTS TO SHARE WITH TEAM MEMBERS

Table 4 shows the results of the Pretest-Posttest. The results showed that students had higher learning achievement after the learning experiences with an average score of 19.33 before and after 24.61. Results showed that $t=53.90$ before the experiences and after learning, it was 43.62 with a significance= 0.000^* (2 tailed).

Testing	Test Value=20					
	t	df	Sig.(2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Pretest	53.901	45	0.000*	19.32609	18.6039	20.0482
Posttest	43.616	45	0.000*	24.60870	23.4723	25.7451

Objective 5. Evaluate students' levels of satisfaction with the learning experiences.

Table 5 shows that the student's satisfaction with the research had an average of 3.91. The average standard deviation was 0.85, and when compared with the criteria, it was found to be at a good level. For performing, results were good to excellent.

Evaluation items		Results		
		\bar{X}	S.D.	Quality level
1	Forming	3.94	0.76	Good
2	Storming	3.87	.070	Good
3	Norming	4.07	0.90	Good
4	Performing	3.85	0.86	Good
5	Adjourning	3.78	0.92	Good
Average		3.91	0.85	Good

Table 6 shows results from the evaluation of teamwork scores of students. The score was satisfactory in all categories. However, in the category of adjourning, Members evaluate work objectives received a rating of Good and Members assess the learning experiment received a rating of Excellent.

Table 6			
EVALUATION OF ENGAGEMENT IN FORMING, STORMING, NORMING, PERFORMING, ADJOURNING ASSESSING AND PLANNING			
Evaluation item	Results		
	\bar{X}	S.D.	Teamwork level
Forming			
Team formation	3.39	0.54	Satisfactory
Creating rules	3.20	0.65	Satisfactory
Setting boundaries with team name determination	3.50	0.62	Satisfactory
Task orientation	2.65	0.48	Satisfactory
Average	3.19	0.57	Satisfactory
Storming			
Members cooperatively use online media	3.20	0.65	Satisfactory
Members agree on the learning mission	2.65	0.48	Satisfactory
Members explore and search together	2.64	0.66	Satisfactory
Members analyze problems together	2.76	0.74	Satisfactory
Members generate comments together	2.65	0.48	Satisfactory
Members collaborate in use of tools	2.64	0.66	Satisfactory
Average	2.76	0.61	Satisfactory
Norming			
Group rules	2.64	0.66	Satisfactory
Average	2.64	0.66	Satisfactory
Performing			
Members evaluate work objectives	4.26	0.88	Good
Members assess the learning experiment	4.83	0.64	Excellent
Members reflect on learning	3.24	0.74	Satisfactory
Members act to achieve learning	3.20	0.65	Satisfactory
Members identify learning issues	2.64	0.66	Satisfactory
Members set action plans	2.65	0.82	Satisfactory
Members summaries results	2.76	0.74	Satisfactory
Average	3.37	0.73	Satisfactory
Adjourning			
Assessment before learning	3.19	0.57	Satisfactory
Assessment during learning	2.72	0.83	Satisfactory
Assessment after learning	2.65	0.82	Satisfactory
Planning for learning	2.76	0.74	Satisfactory
Average	2.83	0.74	Satisfactory

DISCUSSION AND CONCLUSIONS

This study provides an example of how 21st-century models and theories can be applied successfully to guide the design and delivery of learning for undergraduate students using social media tools. The case study drew on a model of group development, along with socio-cultural theory and theories of constructionism and constructivism. These models and theories were applied to the design and delivery of learning experiences for 46, first-year Thai, information technology

students. Teamwork was conceptualized using Tuckman's model of group development. The purpose of the study was to evaluate the effectiveness of the use of the models and theories for designing student and team-directed learning using social media (Tuckman, 1965).

Results of students' satisfaction with the activities were at a satisfactory level. Comparisons between pre and the post-test result showed significantly higher scores for the post-test. These results suggest that, in this context, the learning experiences were successful. Researchers and instructors in other contexts can make use of the model in their context with the same or their own preferred and relevant forms of social media. These might include the use of a learning management system for those instructors who prefer a more structured and controlled environment along with social media tools such as Facebook or productivity and collaboration software such as Padlet (padlet.com). Regardless of the form of social media used, instructors can rely on the study's conceptual framework and satisfaction questionnaire to design learning experiences with social media.

These types of learning experiences may be particularly relevant in online contexts of learning. Online learning is showing growth at all levels from elementary to higher education. What is needed at this level are theories and models such as those presented in this paper that can guide students' collaborative and independent learning activities. There are increasing calls both in online and face-to-face contexts for students to work, not individually, but collaboratively. However, to do this they need tools to do so. This study has shown that Tuckman's model along with constructivist and constructionist theories can provide a foundation or framework that instructors can rely on to orchestrate students' learning in contexts where there is high student-centeredness and collaboration.

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