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PERCEPTIONS OF MOBILE ASSISTED E-COOPERATIVE LEARNING QUALITY

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ABSTRACT

This study was to examine students' learning experience during collaborative learning tasks in a social e-learning environment with mobile apps, based on social constructivism theory in higher education settings. To better understand the quality of students' learning experience, 52 university students answered a questionnaire after experiencing a mobile assisted social e-learning system. The survey was designed to measure 7 variables from students' perspective, positive interdependence, individual accountability, group processing, social skills, face-to-face interaction, quality of feedback, and perceived ability. There were 4 dimensions in evaluating students' quality of learning experiences, usefulness, confidence, motivation, and satisfaction. The results showed that perceived individual accountability and quality of feedback were found to predict perceived learning quality. Further, the results demonstrated that quality of feedback on the social performance of individual group members can enhance the perceived learning quality. Results revealed that students favored working collaboratively using hand-held devices in a socially connected e-learning environment.

Keywords: Mobile techs, social networking apps, cooperative learning, social constructivist

INTRODUCTION

A new generation of mobile wirelessly networked technologies, such as Web 2.0 technologies or social media has increased in popularity and accessibility in recent years. The new wave of Internet technologies are contributing to new forms of learning in this generation of learners. According to O'Reilly (2005), innovative curriculum integrated with multimedia and technology involvement has changed the ways people create, the ways teachers teach, and the ways students learn. The increasing and ubiquitous use of Web 2.0 activities facilitates a more socially connected environment in which everyone is able to learn, teach, and support each other. Educators are beginning to rethink what education means in new ways. Anderson (2007, p. 54) noted: "Education, however, is not only about access to content. The greatest affordance of the Web for education use is the profound and multifaceted increase in communication and interaction capabilities." In today's collaborative Web, knowledge can be co-created and information can be shared by students. Pedagogically, engaging learners in cooperative learning involving sharing their ideas and work cooperatively and helpfully to complete group projects is one of the major pathways to scaffold learning development (Effandi & Zanaton, 2007; Johnson & Johnson, 1994) as learning is a social activity (Chen & Bryer, 2012; Smith & MacGregor, 1992; Vygotsky, 1978).

Currently, an increasingly interest is growing in Web 3.0 technologies for collaboration. Advanced Web 3.0 service features enable users to network and have 24/7 access to

resources through a hand-held device at anytime and anywhere (Borovik, 2011). Based on social constructivism, cooperative learning truly responds to the meaningful learning in this society where people focus more on team work as communication skills are essentially important. Cooperative learning also fosters instructors moving toward student-centered learning with cooperative technologies (Bauersfeld, 1995; Effandi & Zanaton, 2007; Kan, 2011).

The focus of this study is the identification of variables that may impact the degree of students' perceived quality with mobile learning experiences. The module includes the following variables: (1) quality of group in cooperative learning including the subscales of positive interdependence, individual accountability, group processing, social skills, and face-to-face interaction, (2) level of satisfaction with quality of feedback, (3) perceived ability, and (4) perceived quality of learning experience in the mobile learning environment in terms of usefulness, confidence, motivation, and satisfaction.

THEORETICAL BACKGROUND

Social Constructivist and Cooperative Learning

According to Bruner (1987), learning is an activity process in which learners construct new ideas or concepts based on their knowledge and experiences. The social constructivism emphasizes the importance of the learners' needs. Social constructivists' methods thus have been shifted from teacher-centered approach to a more student-centered approach working in groups (Bauersfeld, 1995; Effandi & Zanaton, 2007; Kan, 2011). Learners learn best when they actively involved in the learning process through social interaction with the immediate learning environment (Vygotsky, 1978, Woo & Reeves, 2008). They are encouraged to discover their own solutions and to try out ideas and hypotheses. The responsibility of the instructor is to facilitate the students' learning process as a facilitator so that students can exercise their capabilities in knowledge formation (Doolittle & Hicks, 2003).

Collaboration is the focus to most social constructivism models. It requires students to work together in groups to complete tasks collectively toward academic goals. Results from Johnson and Johnson (1975) study reported positive outcomes from cooperative learning including increasing higher level reasoning, increasing generation of new ideas and solutions, and enhancing transferring of learning between situations. Studies (Tsay & Brady, 2010) also support that cooperative learning is an active pedagogy that fosters higher academic achievement. Five essential elements identified in cooperative learning include positive interdependence, individual accountability, group processing, social skills, and face-to-face interaction (Johnson & Johnson, 1989).

Mobile Applications

Social constructivism claims that learning occurs as a result of social interactions. Clearly, social media applications, such as Facebook and twitter, can be used to foster social interactions between learners (Ford, Bowden, & Beard, 2011; Grodecka, Wild, & Kieslinger, 2009). As Vygotsky (1978) focuses on learning as activity that takes place in a social context, Libert (2010) claims that social media applications harness the power of the crowd. As social learning does not always take place in front of a computer (Ullich et al., 2008), it is essential that learners are able to access data whenever and wherever they want (Walton, Weller, & Conole, 2008). As mobile technology becomes more rooted in one's life, mobile apps developed for mobile technologies are now changing the way people access information. Indeed, hand-held devices provide an emerging portable and potential solution that can provide learners with adaptable and ubiquitous support for accessing data and network with

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Vol. 2 No. 3 August 2013

one another at virtually any place and any time. For instance, learners in this generation use their mobile phones to listen to their course lectures (ex. Podcasts), and for storage and data transfer.

The Most Popular Mobile Social Networking Apps in Asia

While Facebook dominates the North America market, it was no longer the most popular mobile social networking app in many Asian countries based on downloads in July 2011 to July 2012 (Spriensma, 2012). Spriensma (2012) found that applications like LINE and WeChat took over the leading position of Facebook in Asia. The most popular mobile social networking apps in Asia also included Skpye, Google+, and Windows Live Messenger. In general, social networking apps were designed to encourage social networking and communicate among a group of people with a shared or common interest. These most downloaded mobile social networking apps can be briefly categorized into two parts, for communication services (ex. Facebook, LINE, WeChat) and for video teleconferencing services (ex. Google+ Hangouts, Skype).

Quality of Feedback and Perceived Ability

The quality of feedback students give and receive appears as an important role in the process of student learning. Feedback that is specific and timely motivates students to learn. In other words, the lack of prompt feedback reduces interest in learning (Chickering and Gamson, 1987; Desrocher, 2005; Gayton, 2005; Zerihun, Beishuizen, & Os, 2012 ;). Students' perceived ability in collaboration has been found to contribute to their learning motivation. According to the theories of motivation and competence, students need to believe they are competent as their ability to achieve competitively to feel competent (Vansteenkiste & Deci, 2003) and to have a sense of self-worth (Covington, 2000; Martin & Dowson, 2009). Motivation focuses on human's needs for achievement, social approval, or power. Social settings like working in groups, students' abilities are public, observed, dis- or approved, by their peers. Therefore, students' beliefs about their ability play an important role in social settings. However, little literature addresses how the role of perceived ability directly influences on student's quality of learning.

Quality of Learning Experience

Quality of experience particularly with the cooperative learning activities has been conceptualized in several different ways, including satisfaction (Strokes, 2003), engagement (Chickering & Gamson, 1987; McGowan & Graham, 2009), self-regulation and positive affect (Kempler, Linnenbrink, Zusho, & Maehr, 2002), and feedback (Chickering and Gamson, 1987; Desrocher, 2005; Zerihun, et al., 2012). When students are engaged in a quality experience, they increase their level of enjoyment, happiness, self-esteems, concentration, strength, and intrinsic motivation (Csikszentmihalyi & Schneider, 2000).

RESEARCH METHODOLOGY

Sample

The sample was 55 undergraduate enrolled in a speech and debate course at National Formosa University, Taiwan. Males (22%) and females (78%) with a mean age of 22 years were all full-time students. The study was conducted during regular class periods.

Research Instrument

The survey included 47 response and close-ended questions covering 1) demographics, 2) computer experience, 3) mobile device ownership, 4) context of mobile apps, 5) frequency of

interaction with key apps, 6) amount of friends on key apps, 7) group quality in cooperative learning, (8) quality of feedback, (9) perceived ability, and (10) perceived quality of the learning experience in a mobile learning environment. The scale that measures students' perspectives of group quality is divided into five subscales (16 items): positive interdependence (PI), individual accountability (IA), group processing (GP), social skills (SS), and face-to-face interaction (FF). Two items each are designed for the scales of quality of feedback and perceived ability. In addition, the scale that measures students' quality of learning experience of the course is divided into four subscales (13 items): usefulness, confidence, motivation, and satisfaction. Responses are completed on a five-point Likert scale ranging from "definitely agree" to "definitely disagree". Items for frequency of interaction with key apps, participants were asked to respond on a 5-point Likert scale ranging from "very frequently" (100%) to "never" (0%). The researchers piloted the instrument with an English instructor and 5 students who were not participated in the study to ensure that the questions would be interpreted correctly and understood by the target sample. Feedback received helped modify and clarify some of the questions for the internal validity. Internal consistency reliability using Cronbach's α was conducted on the overall 33 item scale and on the each of the subscales. Results indicated that the internal reliability for the overall scale was good; Cronbach's α= .85. Alpha coefficients for the subscales IA (.90), FF (.90), quality of feedback (.85), quality of learning experience (.83) were found to be high, apart for the GP (.64), PI (.62), perceived ability (.46), and SS (.34).

Procedure

The study was implemented and completed in an 18-week semester. During the second week, the students were introduced to the mobile apps, including Faccebook, LINE, WeChat, Google's Hangouts, SMS, YouTube, and received an hour-long training session on how to use these apps. The reason for introducing a variety of apps was that students use mobile technology to access information and to interact or communicate with others, but not necessarily through the same application (Kim & Ball, 2011). In addition, all students were asked to experience a 3-minute video teleconference trial with Google's Hangouts service.

Two group projects (groups ranged in size from 5 to 6) were required to complete for midterm and final exam grades. The students were encouraged to work in groups through mobile apps to interact within the groups and to post/share information to other groups with whom they had communicated with. While preparing the final production, the students uploaded their group projects/rehearsal presentation videos on YouTube and watched and discussed their own YouTube clips together with their team members on Google's Hangouts together. They also posted the YouTube links on the Facebook page. The instructor posted her comments and shared some resources and compliments. Through the Hangouts, the team can make changes to their presentation, get live input from remote team members, or just simply chat and make compliments on each other. The final production of work submissions were required to present in the class during the midterm and final exam weeks. The hard-copy survey was administered during final week.

RESULTS

Descriptive Statistics

A majority (79%) of the respondents had 3-4 years of Facebook experience (mean= 3.39, SD= .11). One-third (38%) of them reported that they had 1-2 year of LINE experience (mean= .99, SD= .12). Almost everyone (98%) of them reported that they had less than a year of WeChat (mean=.64, SD= .04) and Hangouts experience (mean=.41, SD= .00) prior to the

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Vol. 2 No. 3 August 2013

class. Most (81.8%) of the respondents reported that they used smart phones to access data while only a few students accessed data through their iPod touch (7%) and others (2%). The most popular place where students used mobile apps was home, with 75% accessing data frequently. Many (76%) of the respondents also reported that they used mobile apps outside classroom at campus frequently. Similarly, more than half (69%) of the respondents reported that they used mobile apps for commuting to and from school. The least popular place was shopping stores or restaurants. Among the key applications, respondents had more friends on Facebook (mean= 503.78, SD= 57.49) than LINE (mean= 53.91, SD= 7.75), WeChat (mean=35.11, SD= 8.45) and Hangouts (mean= .70). Facebook was used frequently by most the students (95%). More than half of the respondents (60%) used LINE frequently. WeChat (14%) and Skype (27%) were the least used by the respondents.

The measure of the amount of friends on Facebook friend list approached conventional levels of significance as a predictor of quality of learning experience (t= 2.62, p= .01). One possibility is that students overall were positive about the quality of their learning experience in this course. On average, 90% of the participants were displaying positive usefulness of using mobile apps in this collaborative e-learning environment. The rating for social skills (87%) indicated that on average, participants were displaying positive interpersonal communication. As they have more friends on their Facebook friend list, they were more likely to create and share information, and give/receive comments from their peers. Given the importance of social interactions during group tasks and the need for appropriate feedback or resources, it is interesting to state that the amount of friends on Facebook friend list was predictive of quality of learning.

Quality of Learning Experiences

Hierarchical regression was used to explain the relationship between student characteristics and students' quality of experience during the e-cooperative learning environment. Predictors were entered into the equation in four steps. Step 1 comprised gender and years of computer experience. Step 2 comprised numbers of friends on the friend list of the mobile apps and frequency of using mobile apps. Step 3 comprised rating of group quality (5 elements of cooperative learning). Step 4 comprised quality feedback and perceived ability.

Table 1 displays the cumulative R^2, R^2 change, and F-test for each step of the hierarchical regression. The unstandardized regression coefficient (β), the standard error of estimates (SEB), standardized regression coefficients (β) for each variables were then entered into the regression equation and t-test was used to measure the variation in quality of learning experience (Table 2).

Table 1. Hierarchical regression analysis model summary for predicting quality of learning experience (N= 52)

Step	*Predictors*	R^2	ΔR^2	*F*
1	Age, years of compute experience	.04	-.02	.21
2	Number of Friends, frequency of using apps	.26	.08	1.46
3	Group quality (PI, IA, GP, SS, and FF)	.43	.37	6.79*
4	Quality of feedback and perceived ability	.30	.27	10.44*

Note: *p< .001

The hierarchical regression for quality of experience (Table 1) resulted in R^2 =.47, F (11, 50) =3.74, p<.001, effect size (f^2) =.81, indicating that the linear combination of all variables significantly accounted for variance in the dependent variable. Step 1(personal characteristics) did not account for variation in quality of experience (R^2 =.04, F (2, 51) =.21, p> .05). Step 2 (usage of mobile apps) did not approach the level of significance (R^2 =.26, F(2, 50) =1.46, p> .05). However, number of friends on the Facebook friend list (t =2.62, p< .05) accounted for statistically significant variation in quality of learning experience. Step 3 (group quality) contributed significant amounts of variance to the prediction of quality of learning experience (R^2 =.43, F(5, 50) =6.79, p< .001). The overall results show that individual accountability (t =2.03, p< .05) and social skills (t =2.76, p< .001) accounted for statistically significant variation in quality learning experience. Step 4 (quality of feedback and perceived ability) contributed significant amount of variance to the prediction of quality of experience (R^2 =.30, F(2, 50) =10.44, p< .001). Specifically, the results showed that quality of feedback (t =4.51, p< .001) and perceived ability (t =2.30, p< .05) accounted for statistically significant variation in quality of experience.

Table 2. Hierarchical regression analysis summary of the final step for variables predicting quality of learning experience (N= 52)

Variable	*B*	*SEB*	*β*	*t*
Age	.00	.00	.01	.98
Years of computer experience	.04	.10	.64	.46
Number of friends on Facebook	.00	.00	.47	2.62*
Frequency of using Facebook	.07	.18	.06	.40
Frequency of using LINE	.09	.08	.20	1.10
Frequency of using WeChat	-.05	.11	-.07	-.43
Frequency of using Skype	-.04	.09	-.07	-.47
Frequency of using Google+	.12	.07	.25	1.58
PI (positive interdependence)	.11	.19	.07	.56
IA (individual accountability)	.28	.14	.26	2.03*
GP (group processing)	.15	.12	.17	1.27
SS (social skills)	.36	.13	.40	2.76**
FF (face-to-face interaction)	.08	.11	.10	.82
Quality of feedback	.44	.10	.55	4.51**
Perceived ability	.31	.14	.46	2.30*

*p< .05; **p< .001

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Vol. 2 No. 3 August 2013

DISCUSSIONS AND CONCLUSIONS

Using a social constructivist framework of learning environment, this study combined measures of individual usage and context of mobile apps along with measures of variables taken while students were engaged in group projects and many peer interactions through the use of mobile social networking apps. This study examined how these variables would predict the quality of students' learning experiences during e-cooperative learning. The results indicated that quality of learning experiences is best predicted by the situated variables rather than individual demographic variables. Specifically, individual accountability (as students feel their efforts can help their group achieve the goal), as well as social skills (as student feel they are able to enhance their interpersonal communication skills) provided the best explanation of differences in students' quality of learning experience. These two variables accounted for a 38% of the variance. The results were consistent with the previous studies that technology-based learning environments play an important role in supporting social skills (Hassan, Fong, & Idrus, 2011; Woo & Reeves, 2008) and individual accountability (Resta & De Hoyos, 2005). In fact, the results also indicate that in addition to individual accountability, students also needed to perceive that they were competent to their group. That is, because Web social setting where students' abilities can be recognized and their beliefs about their self-worth can be promoted. This finding supports self-worth motivation theory (Covington, 1993; Martin & Dowson, 2009), in which the degree of self-worth learners possess motivate learners to do well and success on tasks at hand.

Learning is a social activity (Chen & Bryer, 2012; Smith & MacGregor, 1992; Vygotsky, 1978) and interaction is the primary element in social activity as the process of learning (Woo & Reeves, 2008). The true alternative for foster interaction with others in the class is a small class lecture. Unfortunately, this alternative in most cases in Taiwan is financially infeasible. Therefore, collaborative web provides some possibilities as Borovik (2011) and Libert (2010) suggest that linking online social networking sites through a hand-held device provides an avenue for small group interaction at anywhere and anytime. In addition, the result also indicated that the quality of students' learning experiences could be predicted by the quality of feedback students gave and received. It corroborated other report (Gaytan, 2005) which indicates that "immediate, ongoing, and detail-oriented feedback assists students in better understanding the material and more effectively applying what they have learned" (p28). Prompt and constant feedback allows the students to quickly correct problems and continue their learning progress.

This study is useful in showing that these undergraduate students had positive feelings about mobile networking learning. It is also useful in showing that wireless and mobile technologies with cooperative learning should be integrated into classroom-based environment. The wireless mobile technologies have afforded individuals the opportunity to work collaboratively and stay connected. Students can be organized into groups, seeking new knowledge, sharing learning materials through mobile apps or/and with face-to-face communication, and continuing their learning process beyond the classroom. Therefore, mobile-based e-learning environment and classroom-based environment is complementary each other.

Finally, the message of this study is very clear; mobile social networking apps have proved to be a technology valued by students. Results suggest that e-cooperative learning with mobile networking apps promoted a social constructivist learning environment in which makes the need for the newly acquired knowledge evident and perceived as useful to the students. Apart from learning, they developed their skills and confidence in the usage of multimedia and Web apps which is one of the important elements in this rapid developing country.

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Vol. 2 No. 3 August 2013

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Keywords: mobile assisted language learning (MALL), preservice English teachers, perceptions, English language learners, mobile devices 1. Introduction Over the last three decades second or foreign language (L2) instruction has been one of the major subject areas of education in which technology has played a central role.Â Despite ongoing barriers to m-learning such as cost, technical considerations, accessibility, and attitudinal factors (Joint Information Systems Committee [JISC], 2013), the available evidence seems to suggest that m-learning is globally on the rise (Dudeney & Hockly, 2012; Hockly, 2013). The application of Mobile Assisted Language Learning (MALL) currently increases with the use of a handheld mobile device especially in the Malaysian context. In 2008, the Malaysian Communication and Multimedia Commission (MCMC) has conducted a survey. The findings indicate that the main users of mobile phone were those between 20 to 49 years (Hussin et al., 2012) , and the number is rising, along with improved ease of access to and sharing of information.Â They believed that using MALL makes it easier to do task as well as improves the quality of task they do. Meanwhile, the respondents reported that they were slightly agreed with the other items on perceived usefulness. Research on the use of mobile-assisted language learning tools is a relatively new and rapidly growing field. The primary pedagogical implications that we can derive from this incipient body of knowledge is that making mobile applications, such as Extempore, a part of the learning process is generally well received by students; it results in increased practice; and, therefore, it promotes language development.Â Al-Jarf, R. (2012). Mobile technology and student autonomy in oral skill acquisition. In J. DÃaz-Vera (Ed.), Left to my own devices: Learner autonomy and mobile-assisted language learning innovation and leadership in English language teaching (pp. 105â€“130). Bingley, UK: Emerald Group. Ally, M., Tin, T., & Woodburn, T. (2011). To better understand the quality of studentsâ€™ learning experience, 52 university students answered a questionnaire after experiencing a mobile assisted social e-learning system. The survey was designed to measure 7 variables from studentsâ€™ perspective, positive interdependence, individual accountability, group processing, social skills, face-to-face interaction, quality of feedback, and perceived ability. There were 4 dimensions in evaluating studentsâ€™ quality of learning experiences, usefulness, confidence, motivation, and satisfaction. The results showed that perceived individual accountabil Mobile-assisted language learning (MALL) has developed over the past decade as a sophisticated field within its own right, with an increasing number of articles that examine various mobile devices used in environments both inside and outside of formal language learning situations. MALL has been defined as the use of â€œmobile technologies in language learning, especially in situations where device portability offers specific advantagesâ€ (Kukulska-Hulme, 2013, p. 3701). MALL includes devices ranging from MP3/MP4 players, smart phones, and e-book readers through to laptop and tablet computers.