THE RELATIONSHIPS BETWEEN WEB 2.0 TOOLS, COOPERATIVE LEARNING AND HIGHER ORDER THINKING AMONG KING SAUD UNIVERSITY STUDENTS

by

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ABSTRAK

Persekitaran pembelajaran lestari bagi tujuan perkongsian ilmu kini merupakan prinsip penting di institusi pengajian tinggi, IPT di Arab Saudi. Di institusi-institusi pengajian tinggi tersebut, pengajaran biasanya adalah berpusatkan guru yang tidak memberikan peluang untuk pelajar berkomunikasi dengan instruktor mereka atau untuk membina kumpulan pembelajaran. Situasi sebegini dipercayai akan memberi kesan terhadap ciri-ciri pembelajaran pelajar. Para instruktor di IPT di Arab Saudi berharap untuk mendapatkan kefahaman yang lebih tepat dan mendalam mengenai kesan alatan Web 2.0 terhadap perkembangan kemahiran pemikiran aras tinggi pelajar (KBAT) serta aktiviti-aktiviti kerjasama berkumpulan. Justeru, kajian ini dilaksanakan bagi menentukan bagaimana pemikiran reflektif, perkongsian pengetahuan, interaksi dan fleksibiliti dalam penggunaan alatan Web 2.0 memberi kesan terhadap ciri-ciri pelajar serta ciri-ciri instruktor. Ia juga bertujuan menyiasat kesan Web 2.0 terhadap KBAT serta pembelajaran koperatif mereka. Kaedah penyelidikan campuran dilaksanakan dalam kajian ini di mana pendekatan kuantitatif dan kualitatif digunapakai. Bagi pendekatan kualitatif, kajian ini mengumpul data melalui temubual kumpulan berfokus terhadap 15 orang pelajar. Sementara itu, pendekatan kuantitatif melibatkan pentadbiran soal selidik kepada 241 orang pelajar dari Kolej Perguruan, Universiti Raja Saud, Arab Saudi. Analisis Faktor Eksploratori (*Exploratory Factor Analysis*, EFA) dan analisis regresi digunapakai untuk

menganalisis data. Penggunaan EFA telah menghasilkan beberapa sub-faktor berkait dengan pembolehubah yang dikaji. Dapatan juga menunjukkan faktor-faktor berkaitan pemikiran reflektif, perkongsian pengetahuan, interaktiviti dan fleksibiliti memberi kesan positif terhadap ciri-ciri pelajar dan instruktor; seterusnya menghasilkan kesan positif terhadap faktor-faktor berkaitan pembelajaran koperatif dan KBAT. Faktor-faktor pembelajaran koperatif juga turut mempengaruhi perkembangan KBAT pelajar. Dapatan ini menunjukkan alatan Web 2.0 berpotensi untuk memainkan peranan penting dalam perkembangan aras tinggi pelajar di Universiti Raja Saud kerana ia memberikan peluang untuk mereka berinteraksi, memberikan refleksi serta maklumbalas yang berkualiti. Kajian ini menunjukkan perlunya satu transformasi terhadap aktiviti dalam bilik-bilik kuliah, di Universiti Raja Saud iaitu daripada persekitaran pembelajaran pasif kepada sesuatu yang lebih aktif dan bermakna yang bukan sahaja menekankan kepada isi kandungan semata-mata tetapi juga menyediakan para pelajar dengan kemahiran kognitif sepanjang hayat. Oleh yang demikian, kajian ini menawarkan panduan kepada Kementerian Pengajian Tinggi di Arab Saudi untuk mempertimbangkan penggunaan alatan Web 2.0 dalam aktiviti pengajaran dan pembelajaran di peringkat universiti.

THE RELATIONSHIPS BETWEEN WEB 2.0 TOOLS, COOPERATIVE LEARNING AND HIGHER ORDER THINKING AMONG KING SAUD UNIVERSITY STUDENTS

ABSTRACT

The aim of providing a sustainable learning environment for sharing knowledge has become the main priority of higher education in Saudi Arabia. In Saudi universities, teaching is mostly conducted based on a teacher-centered method, which deprives students of the opportunity to communicate with their instructors or create their own group. This situation, in turn, is believed to affect the students' learning characteristics toward the course. Instructors in different Saudi universities hope to have a more precise and efficient understanding of the effects of Web 2.0 tools on the development of students' higher-order thinking skills and group cooperative learning activities. Hence, this study is conducted to determine how reflective thinking, knowledge sharing, interaction, and flexibility in using Web 2.0 tools affect students' characteristics and instructor's characteristics in learning. It also examines the effects of Web 2.0 on the development of students' higher-order thinking skills and cooperative learning. A mixed method design was used in this study for the purpose of data collection, in which both quantitative and qualitative methods were used. For the qualitative approach, the study obtained the data through focus group interview from 15 students. Meanwhile quantitative method based questionnaire was used to collect data from 241 students at the College Of Education, King Saud University in Saudi Arabia. Exploratory Factor Analysis (EFA) and regression were used to analyse the data. The EFA yield on different sub-factors related to the study variables. The results showed that factors related to

reflective thinking, knowledge sharing, interactivity, flexibility positively affected the factors of students' and instructors' characteristics, and such positive effects, in turn, induced a positive effect on the factors related to students' cooperative learning and higher-order thinking. Cooperative learning factors also influenced the development of students' higher-order thinking. These findings indicate that Web 2.0 tools have the potential to play a key role in the development of higher order thinking in King Saud University as they allow them to interact, reflect and provide quality responses. This study points to a needed transformation of the classroom in King Saud University from a passive learning forum to a learning environment that focuses not only on content, but also on the goal of equipping students with lifelong cognitive skills. Therefore, this study offers the guidelines for the Ministry of Higher Education in Saudi Arabia to fully consider the use of Web 2.0 tools in teaching and learning activities in higher learning institutions.

CHAPTER 1: INTRODUCTION

1.1 Introduction

Learning and teaching methods have become increasingly knowledge-based, interdisciplinary, and complex in the new information age. The current use of alternative tools for fostering learning is necessary to help learners solve problems and complete sophisticated tasks related to learning. Thus, cooperative learning is highly valued in the educational environment (Barron, 2000). To provide a cooperative learning environment among learners, the major aspects associated with student behaviors that can be experienced through online learning tools must be identified.

Furthermore, the aim of providing a sustainable learning environment for sharing knowledge has become the principal priority of higher education in Saudi Arabia, which is believed to undergo fundamental changes in the performance of teaching and learning (Alamri, 2011). These changes may ensue because universities and colleges respond to different trends related to global, social, technological, and learning research. Thus, the focus of higher education environment is to provide sufficient access to more content in digital formats. This priority is reflected on the current use of web-based technologies, particularly Web 2.0 tools and services, which has increased the interest of the new generation of learners (Bryant, 2007).

Web 2.0 technologies include blog, wiki, podcast, social bookmark, tags, really simple syndication, and social network software. These technologies have the

features of social interaction and collaboration to facilitate knowledge sharing and exchange over the Internet platform (Lau & Tsui, 2009; Lytras & de Pablos, 2009). They allow their communities to publish and share content by themselves and edit content collaboratively and interactively. Through social interaction and collective intelligence, knowledge is created, exchanged, shared, and created.

Web 2.0 technologies have changed the manner in which the web is used and perceived. Rather than a mechanism for providing information, the web is now interactive and harnesses the wisdom of many individuals through wikis, blogs, and other social communities. New terms have been coined or resurrected to explain this new phenomenon, including crowd sourcing, social networking, and collective intelligence (Gibson, 2007). Thus, most learning institutions depend not only on the web as a tool for information dissemination but also as a mode for including the customer base in design, development, and support (Marcet, 2011).

The identification of Web 2.0 tools encompasses a wide range of different indications that include an increased prominence on learner- or end user-generated content, data and content distribution and collaborative effort, along with the utilization of several educational and social applications, additional means of interacting with web-based applications, and the use of the web as a platform for generating, repurposing, and consuming content (Selwyn, 2007). Utilizing these contents can be observed in different social and learning cases in terms of employing various computing tools to achieve the goal of certain learning strategies that may support, facilitate, and improve learning processes. Thus, learning through Web 2.0 tools is considered very flexible in accommodating the major learning needs. This

process usually occurs by reporting different learning channels (Chi, 2009), by supplying more engaging learning environments, supporting personalized approaches of retrieving, organizing, and delivering information (Redecker & Punie, 2010), engaging learners and teachers with different learning tools, and adapting learner perspectives into a collaborative group to effectively develop the cooperative structure of content and offer peer support and assistance.

Web 2.0 tools also facilitate the implementation of learning strategies (i.e., learning contracts, small group work discussion, project lecture, cooperative learning, self-directed learning, case study mentorship, and forum) that are customized to each learner's perspectives toward using these tools in learning, based on the interests and needs of the learner, provide suitable learning environments that consider individual differences, and sustain differentiation in various learning groups (Tomlinson et al., 2003).

Different types of web tools and services with the basics of the Web 2.0 concept are available to support the learning process because these tools and services are already being integrated to fit a specific form in education (Rigby, 2008). These are not merely technologies per se, but services established based on the utilization of technology components and open standards that emphasize the Internet and the web. These services include blogs, wikis, multimedia sharing services, content syndication, podcasting, and content tagging services (Anandarajan & Anandarajan, 2010). Many of these web technology services are comparatively established because they have been developed for several years. Moreover, the up-to-date contents and its

potential to individual learners are beneficial for effective learning online based on the premises of constructivism theory (Conole & Alevizou, 2010).

However, several attributes of Web 2.0 support constructivist and cognitive teaching and cooperative learning. Examples of these attributes are: low threshold applications, variety of tools and models, and low cost and networked community (Cheon, Song, Jones, & Nam, 2010). Hence, the opportunity to select a tool that matches the learners' mental model is challenging. Instead, the learner choices are typically constrained to those who are familiar to use technology. Thus, teachers and students must be engaged in these attributes to accomplish tasks (Grant & Mims, 2009). The current study uses Web 2.0 tools such as LMS Blackboard, conferencing, discussion forum, etc. for developing higher-order thinking skills and cooperative learning among Saudi university students.

1.2 Background

Web 2.0 tools promote and support the creation, formation of knowledge, sharing, and adaption of open educational resources to fit a definite learning environment that usually follows specific teaching approaches. According to Geser (2007), "new educational approaches are not easily found and their implementation will be difficult if they require considerable transformations of current educational frameworks and practices" (p. 265). Virkus (2008) has also reported that "the use of Web 2.0 technologies in higher education is still a new phenomenon and its integration into teaching and learning is in the initial phase" (p. 265). Thus, the focus in education currently includes providing access to more content in digital formats. However, the effectiveness of these tools in promoting real innovation in teaching

and learning, particularly in developing the thinking skills of learners, is not established (Cheon, et al., 2010).

At present, experiments on Web 2.0 tools and learning services are carried out in universities, colleges, and schools. For example, wikis were determined to be the most effective Web 2.0 tool. Weblog or blogging also has several uses. Complex social networks are not new; however, with recent technological developments, social networking has emerged as a dominant form of social organization (Barry, 2002). Technology has allowed individuals to form communities based on their shared interest rather than understanding (Luft & Roehrig, 2007). In addition, computer-mediated communication networks link users into computer supported social networks, hence the development of Web 2.0 (Zohar & Dori, 2003). Shepard (1991) argues that the most serious consequence of the mastery learning model of instruction is that higher-order skills that occur late in the hierarchy are not introduced until a definite learning conditional skill emerges. Frequently, students never reach the point where they have the opportunity to engage in higher-order skills. Another related consequence of student engagement, as described above, is that learning also often becomes hierarchical in terms of the level of students. Behaviorist theory proponents like Barry (2002) state that students learn best when complex learning is broken down into smaller parts that are ordered sequentially.

Students with low attitude and appreciation may constantly perform less, which may somehow depend on the encouragement and participation of the instructor in the very early stages of the learning process (Gorham & Zakahi, 1990). Most of these associations are based on learner and instructor characteristics (Toutkoushian & Smart, 2001) that differ from one individual to another. By contrast, students with a

higher learning performance are usually directed with basic skills that are regarded as prerequisites to carry out more additional learning tasks. For instance, Peterson (1988) has criticized that the traditional curriculum, which used to be challenging for students, generally emphasizes the sequences of learning according to the suitability of higher-order objectives for the later stages in the learning sequence. Thus, some students are effectively equipped with advanced learning tools and materials; by contrast, the performance of other students remains the same even when they have opportunities to develop their thinking skills.

Several researchers (for example: Zohar, Degani, & Vaaknin, 2001) show that the theories and beliefs adopted by teachers significantly affect their mode of teaching. Thus, the belief that achieving goals related to the requirements of higher-order thinking depends on the participation of both the students and the instructor in collaborative learning tasks.

The major process involved in collaborative learning depends on grouping and pairing students to attain an academic goal. Cooperative learning activities are identified as an instructional method in which different students at various performance levels work together in small groups to achieve a common goal (Gokhale, 1995). The students are responsible for one another's learning as well as their own. Thus, the success of one student who helps other students succeed can promote the development of thinking skills. The proponents of collaborative learning assert that the active exchange of ideas within small groups not only increases the interest among the participants but also promotes critical thinking. The shared learning provides students with an opportunity to engage in discussion and take

responsibility for their own learning, thus becoming critical thinkers (Totten, Sills, Digby, & Russ, 1991). Despite these advantages, previous and present studies on collaborative learning have disregarded the current individual's characteristics associated with the learning activities with the learning tools. Empirical evidence on how the characteristics of students and instructors drive collaborative learning for developed thinking skills in the online environment remains limited. However, non-competitive and collaborative group work in Saudi universities is highly needed (Tumulty, 2001). Furthermore, the majority of studies on collaborative learning have been conducted in non-technical disciplines. The advances in technology and changes in the organizational infrastructure have increased the emphasis on teamwork within the workforce. Thus, developing and enhancing critical thinking skills through collaborative learning is one of the primary goals for the current study. This study was designed to examine the effectiveness of cooperative learning as it relates to the development of thinking skills at the college level. Web 2.0 tools here are used to allow learners engage in cooperative learning activities by providing the communication channels for them to share knowledge and think reflectively in certain learning situation. In addition, the use of Web 2.0 tools offer an interactive and flexible learning medium with adequate amount of quality information relevant to their needs resulting positive learning characteristics necessary for the development of their higher-order thinking and cooperative learning skills.

1.3 Problem Statement

The current generation of students entering universities and colleges uses various Web 2.0 tools, such as wikis, blogs, RSS, podcasting, and social networking,

in their daily lives (Lenhart & Madden, 2005; 2007). Some educators (i.e., Alexander, 2006a; Prensky, 2001; Roberts, Foehr, & Rideout, 2005; Strom & Strom, 2007) suggest that Web 2.0 tools must be utilized in universities because students with a digital native background expect to learn with new technologies. Assessing the potential of university students is essential for developing and improving their learning outcomes (Donnison, 2007).

In Saudi universities, teaching is mostly conducted based on a teacher-centered method, which deprives students of the opportunity to communicate with their instructors or create their own group (Al-Mohanna, 2010). This situation, in turn, is believed to affect the students' learning characteristics toward the course. This issue was also acknowledged by other scholars, such as Rugh (2002) who pointed out that Saudi university students "are not given enough opportunities to develop problem-solving skills, communicative skills and to use their creativity" (p. 53). Al-Mohanna (2010) investigated the lecturers' background to determine whether they had been exposed to communicative approaches of learning. His finding indicates that most lecturers are likely to teach in the same manner that they were taught without considering the adoption of new technology into teaching. Lecturers in Saudi universities are not given the chance to be exposed to new modes of teaching. The traditional teaching approach primarily focuses on the memorization of learning contents and lacks cooperative learning activities among students. Thus, online educational tools such as Web 2.0 must be adopted in the current learning process.

Although new learning practices for transmitting information and developing students' thinking have been widely used in other parts of the world, the lecture

format continues to be the dominant mode in Arab educational settings (Vassall-Fall, 2011). Students still utilize textbooks to learn. This learning process provides indisputable facts for those students to use new learning tools. Students in Saudi Arabian universities are rarely called to analyze or critique during the learning process in any manner (Al-Rajhi, 2006; Bennani, Elsadda, Fergany, Jadaane, & Kubursi, 2003). This form of teaching reduces the students' ability to reflect their thinking into ideas for problem solving, thereby stifling creativity, collaboration, and innovation (Vassall-Fall, 2011). However, the most important challenge seems to be the transformation of the characteristics of teaching practice in classrooms to provide an environment that is conducive for the teaching and learning of higher-order thinking skills and facilitate influential learning by students.

These challenges also concern educators and other high education decision makers in the Middle East who understand that the demands of the technological age require students to think and solve problems as rote memorization hinders the development of such skills (Smith, 2004). Several researchers (i.e., Bersamina, 2009; Rugh, 2002) suggest that Saudi universities must adopt the new technologies to measure their effects on the thinking ability and group learning approach of the students.

Thus, students are required to contribute in moving the learning and teaching process forward in the 21st century. Researchers (i.e., Rugh, 2002; Nagappan, 2002) suggest that lecturers must use modern teaching methods to offer a collaborative learning environment and thus develop the thinking level of learners. Instructors in different Saudi universities hope to have a more precise and efficient understanding of the

effects of Web 2.0 tools on the development of students' higher-order thinking skills and group collaborative activities (Vassall-Fall, 2011).

Ibraheem and John (2012) contend that the "implementation of Web 2.0 tools in Saudi higher education (SHE) is in its very early stages" (p. 2). Web 2.0 tools, such as wikis and blogs, are implemented to address one of the major challenges addressed by SHE in providing educational institutions to the rapidly growing student population in Saudi Arabia. With the limited capacity of universities, the Ministry of Higher Education has realized the need for integrating web-based instruction with traditional instruction to tackle this problem (Alebaikan, 2010).

In various educational environments, collaboration is recognized as an essential competency in the current knowledge society. In the new information age, work has become increasingly knowledge-based, interdisciplinary, and complex. An individual will experience difficulty in completing a complicated learning task without collaboration with others. Collaboration involves three levels, namely coordination, cooperation, and reflective communication (Engeström (1994). Some researchers (e.g., Barron, 2000; Brooks, 1990; Lipponen, Hakkarainen, & Paavola, 2004; Neo, 2003) have acknowledged that learning within a collaborative group helps deliver better learning outcomes than individual work. However, in Saudi Arabia, most students in groups find that arranging a common time and place for the meetings is difficult and often unproductive because members usually complain that they have other commitments; thus, meetings end abruptly (Alebaikan, 2010).

This study is conducted to determine the students' reflective thinking, knowledge sharing, interaction, and flexibility in using Web 2.0 tools in learning. It also examines the effect of Web 2.0 on the development of students' higher-order thinking skills and cooperative learning in Saudi universities.

1.4 Research Objectives

This study aims to apply Web 2.0 tools integrated within the online context to develop higher-order thinking skills through cooperative learning among Saudi university students. Thus, the objectives of this study are as follows.

1. To investigate the effects of reflective thinking, knowledge sharing, Web 2.0 interaction, and flexibility in using Web 2.0 tools on students' and instructors' characteristics
2. To examine the effects of students' and instructors' characteristics from using Web 2.0 tools on the students' cooperative learning
3. To explore the effects of students' and instructors' characteristics from using Web 2.0 tools on the development of the students' higher-order thinking skills
4. To analyze the effects of cooperative learning on the development of students' higher-order thinking skills in using Web 2.0 tools

1.5 Research Questions

This work aims to answer the following questions:

1. What are the effects of reflective thinking, knowledge sharing, Web 2.0 interaction, and Web 2.0 flexibility using Web 2.0 tools on students' characteristics?
2. What are the effects of reflective thinking, knowledge sharing, Web 2.0 interaction, and Web 2.0 flexibility using Web 2.0 tools on instructors' characteristics?
3. What are the effects of students' characteristics from using Web 2.0 tools on their cooperative learning?
4. What are the effects of instructors' characteristics from using Web 2.0 tools on the students' cooperative learning?
5. What are the effects of students' characteristics from using Web 2.0 tools on the development of their higher-order thinking skills?
6. What are the effects of instructors' characteristics from using Web 2.0 tools on the development of students' higher-order thinking skills?
7. How does cooperative learning affect the development of students' higher-order thinking skills?

1.6 Limitation

This research is limited on the use of Web 2.0 tools (i.e., wiki, dashboard, journal, learning module, and blog) as instructional methods for efficiently promoting the active participation of students during their learning processes, particularly while working in groups. The population of the study is limited to the undergraduate students at King Saud University in Saudi Arabia. Questionnaires and interviews are used in this study to examine and validate the proposed model. To

keep the research within manageable proportions for rigorous investigation and maintain parsimony, Limbach and Waugh (2010) model and activity theory and cognitive constructivist belief theory are included in the present study to establish the relationship between the research variables.

1.7 Theoretical Framework

The conditions necessary for the success of higher-order thinking and cooperative learning must be thoroughly investigated. The beliefs of learners and teachers are crucial factors in determining the effect of any educational endeavor. Thus, examining such beliefs in the context of knowledge contribution and sharing is crucial. The individual or learner is mostly accountable for sharing knowledge (Vuorinen, Tarkka, & Meretoja, 2000). Vuorinen et al., have indicated that individual interaction becomes prominent only when the performance of individual is assessed and the benefits are returned to the group that performs definite learning activities.

The process for developing higher-level thinking skills (Limbach & Waugh, 2010) and activity theory (Jonassen & Rohrer-Murphy, 1999) are employed to construct the present research framework along with cognitive constructivist theory. Higher-order thinking pertaining to thinking that typically occurs “in the higher levels of the hierarchy of cognitive processing that focus on the main aspects of the cognitive constructivist belief” (Limbach & Waugh, 2010, p. 23). Meanwhile, activity theory focuses on the broader social and cultural context of human activity, thereby providing a comprehensive explanation of social interactions and relationships.

Lytras and de Pablos (2009) argued that adapting various teaching theories and concepts in a real environment and learning through social interaction (i.e., wiki) would help promote the reflective thinking of the learner to experience, conceptualize, apply, and create new knowledge to solve problems. Activity theory is one of these concepts involving the interaction between individual activity and consciousness within its relevant environmental context. Individual activities are typically driven by certain needs in which individuals desire to fulfill specific purposes. An activity is undertaken by a subject (individual or subgroup) using tools to achieve an object (objective), thus transforming objects into outcomes (Uden, Valderas Aranda, & Pastor, 2008). The relationship between the subject and object of activity is mediated by a tool (Kuutti, 1996) . The activity theory was used in this study to explain the effect of environmental elements in terms of Web 2.0 knowledge sharing, Web 2.0 reflective thinking, Web 2.0 interaction, and Web 2.0 flexibility on learners' behavioral changes in order to achieve the desired outcomes. It was assumed that Web 2.0 can act as a mediating tool for learners to learn effectively by sharing and exchanging knowledge in interactive and flexible manner. This is also believed to promote learners' learning characteristics for higher order thinking and cooperative learning.

The weight that the critical success factors process to effectively utilize online tools within a university setting can be grouped into instructor and student characteristic processes for successful use associated with technology and support.

The instructor's role in forming the online learning activities could include the effectiveness and success of e-learning-based courses. Willis (1994) as well as

Moore and Kearsley (2011) acknowledged that the instructional implementation of technology primarily facilitated the effectiveness of e-learning. Webster and Hackley (1997) developed three characteristics related to instructor participation in effective e-learning, namely, information and communication technology (ICT) competency, teaching style, and attitude and mindset. Volery and Lord (2000) suggested that instructors must provide various forms of office hours and contact methods with students. Instructors must adopt an interactive teaching style and encourage student–student interaction. Furthermore, instructors must exert good control over ICT and cultivate their ability to perform basic troubleshooting tasks.

In addition, university students should be considered in terms of processing higher demands for learning in e-learning-based courses (Garrison & Kanuka, 2004). Students must process knowledge to manage learning-related tasks along with their computer skills. Beyth-Marom, Chajut, Roccas, and Sagiv (2003) stated that e-learning-based courses compared favorably with traditional learning, and that e-learning students performed as effectively as or better than traditional learning students. This result indicates that students prefer to use e-learning if it facilitates their learning and allows them to learn any time anywhere in their own way (Papp, 2000).

Engeström (2009) argued that applying Web 2.0 tools based on activity theory would promote the reflection of good communication and thinking based on the dominant mode of interaction and social production. This approach would also help learners arrange their ideas and mode of thinking, which may increase individual achievements among the group while learning.

Vygotsky (1980) proposed the zone of proximal development and scaffolding theory and posited that learning as a process was not development. He acknowledged how the process of sharing and organizing learning outcomes help facilitate the mental development that would not occur without the learning process. Vygotsky stated that the capacity to create the zone of proximal development characterized learning; that is, learning awakens a range of internal developmental processes when an individual engages in interactive peer learning. Once these processes are internalized, they become part of the person's independent developmental achievement. This method differs from the traditional model for instruction in which a teacher transmits information to students (Gredler, 2009). Utilizing Web 2.0 tools could promote cooperative learning through which the students' characteristics can be affected, thereby developing their higher-order thinking and cooperative learning.

Vygotsky's zone of proximal development and scaffolding is the key concept for stating the learners' ability to achieve learning goals with the assistance of others (social interaction), which may be more indicative of their mental development than what they can do alone (Vygotsky, 1980). Mental development occurs while learning in Web 2.0. Thus, the researcher referred to online learning theory by Anderson (2008) to demonstrate the interaction between learners and a teacher in the online environment and how the resulting interaction affects communication, as shown in Figure 1.1. Anderson's model illustrates how learners can interact directly with the content that they find in multiple formats, particularly on the web. However, several learners prefer to have their learning sequenced, directed, and evaluated with the assistance of a teacher. This interaction can transpire within a community of inquiry using various synchronous and asynchronous activities (i.e., video, audio, computer

conferencing, chats, and virtual world interaction). These environments are mostly rich and allow the learning of social skills, cooperative learning of content, and development of individual relationships among other participants. Using the online model requires the active participation of both teachers and students to facilitate the interactive learning process for simulating cooperative learning based on the prescribed nature of learning.

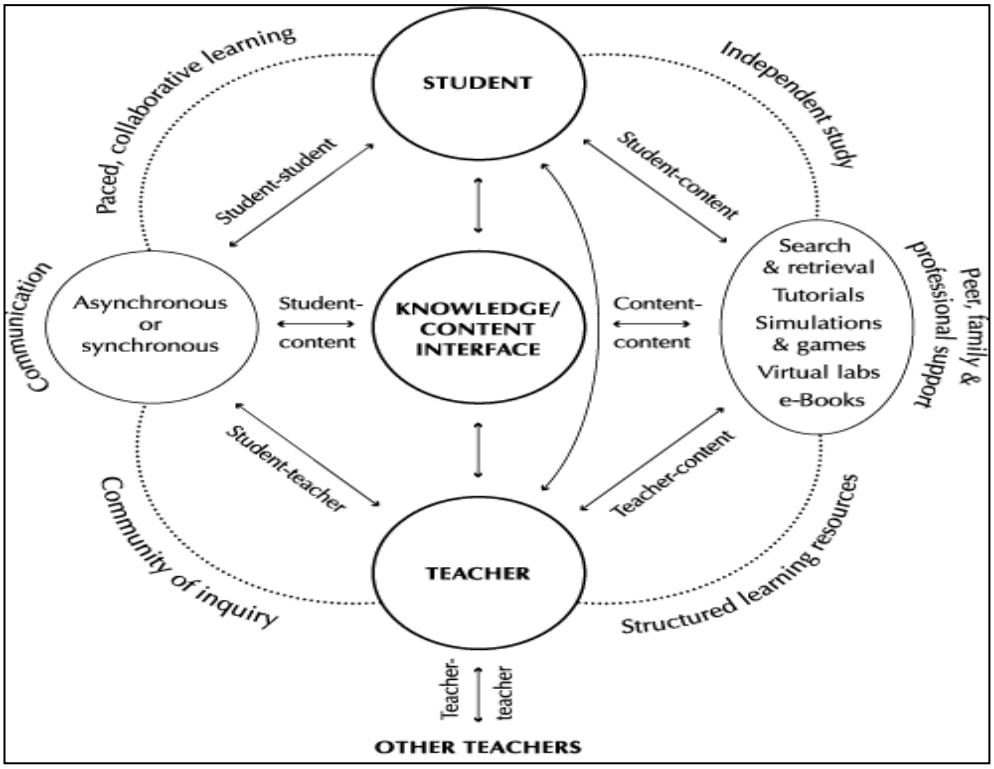

Figure 1. 1: Model of online learning showing the types of interaction (Anderson, 2008)

Thus, this study is conducted based on the aforementioned theories and other findings of scholars to enhance the students' higher-order thinking skills and cooperative learning using Web 2.0 tools in their learning.

1.8 Research Significance

Emerging research has highlighted the ways in which teaching and learning can benefit from the inclusion of Web 2.0 tools in specific contexts or disciplines. However, the effectiveness of certain tools in one discipline over others remains unclear.

Thus, investigating the effects of Web 2.0 tools among the students in King Saud University has specific advantages. This study could help demonstrate the capacity of Web 2.0 tools to provide interactivity among students in this university based on their interaction with content. This work may also enable both learners and teachers to build their knowledge, develop self-learning skills, and enhance their collaborative learning skills. This study may also provide the following advantages:

1. present King Saud University with evidence on how using Web 2.0 can promote students through reflective thinking, knowledge sharing, individual interaction, and tool flexibility;
2. strengthen the students' ability to understand the learning topic by indicating the influence of their characteristics and the instructor's characteristics on their collaborative learning activities;
3. help students and teachers improve their thinking ability and problem-solving skills; and
4. investigate the effects Web 2.0 would provide to the students' various perspectives in utilizing Web 2.0 and its relation to the development of students' collaborative learning activities and higher-order thinking skills.

In overall, this study will contribute in determining how Web 2.0 tools could enhance the cooperative learning and thinking skills of students. It will also examine and measure the capacity of Web 2.0 tools to promote reflective thinking, knowledge sharing, interaction, and flexibility.

1.9 Definitions of Terms

Web 2.0 tools: the means of creating, editing, and sharing learning contents through the Internet with interactive web application features that facilitate information sharing, interoperability, and user-centered design among different learners in a set of individual or group. Among the Web 2.0 tools used in this study are online discussion, Blackboard, voice board, voice email, and voice broadcaster.

Higher-order thinking: the degree that requires Saudi university students to direct information and generate ideas in ways that transform their meaning and implications in Web 2.0. This transformation occurs when students understand ideas and synthesize, generalize, explain, hypothesize, or arrive at some conclusion or interpretation. Manipulating information and ideas through these processes allows students to solve problems and order their mode of thinking, thereby prompting them to discover new meanings. The standard in measuring the higher-order thinking skills of Saudi students using Web 2.0 tools are adapted from Lin and Tsai (2012).

Cooperative learning: the process of re-conceptualizing the individual activities into a collaborative group at the level of reflective communication. This process also relies on the students' relationship with their shared objects and activities among other group members in the learning environment (Lipponen et al., 2004). In the

current study, individuals within each group reflect their own and the other members' contributions to the shared problem, what they have learned in the learning process, how they work cooperatively, and how they could further improve the learning process. The considerations in assessing the cooperative learning of Saudi students using Web2.0 tools are adapted from Neo, Neo, and Kwok (2009).

Reflective thinking: this factor involves personal consideration of the individual learning achievements after completing a definite learning task. Reflecting of thinking usually occurs when individual responds to academic work, as a follow up to a cooperative activity (Given, 2002). In this study, the considerations in measuring the students' reflective thinking in using Web 2.0 are adapted from Kember et al. (2000).

Knowledge sharing: activity through which knowledge (i.e., information, skills, and expertise) is exchanged among individuals in the group. In this study, the knowledge sharing from using Web 2.0 tools is measured based on the items adapted from several authors (Bakhuisen, 2012; Rad, Alizadeh, Miandashti, & Fami, 2011).

Students' characteristics: refer to the students' attitude toward the usage of Web 2.0 tools; that is, whether these tools facilitate their learning and allow them to learn any time anywhere in their own way (Papp, 2000). It is evident that attitudes of learners influence their perception of the process they are involved with. It also allow learners to determine how to respond to different entities when progressing in a learning task. In the present study, the items for measuring students' characteristics are adapted from Soong, Chuan, Chai, and Fong (2001) as well as Selim (2007).

Instructors' characteristics: denote the instructor's ability to adopt an interactive teaching style and encourage student–student interaction. These characteristics also pertain to the instructor's control over ICT and his/her ability to perform basic troubleshooting tasks. In this study, the items for measuring instructor characteristics are adapted from Volery and Lord (2000); that is, students will observe their instructor's characteristics based on their participation.

Interaction: refers to the student's interaction and engagement level to Web 2.0 tools. In this study, the student's interaction towards Web 2.0 tools will be measured based on the adapted items from Arbaugh (2000).

Flexibility: pertains to the students' ability to perform different learning tasks associated with their learning using Web 2.0 tools. In this study, Web 2.0 flexibility will be measured based on the adapted items from Arbaugh (2000).

1.10 Summary

This chapter illustrated the main research elements in terms of research background, problem, objective, scope, framework, significance, and structure. It also introduced the motivational factors that induced the use of cognitive constructive beliefs in developing Saudi university students' thinking skills along with the use of activity theory in developing cooperative learning while using Web 2.0 tools. The chapter also explained the existing issues in the current mechanisms of utilizing the Web 2.0 tools among the students and how those tools affect their level of thinking. The next chapter presents a literature review of previous studies in various fields related to the use of Web 2.0 in education.

CHAPTER 2: LITERATURE REVIEW

The conceptual framework of this work and those of previous studies are presented in this chapter. The relationship between the study variables is constructed based on the current literature. A summary is also provided at the end of this chapter.

2.1 Introduction

The Kingdom of Saudi Arabia is experiencing tremendous growth, as the population has tripled over the last 30 years by 33%; the total population is currently 20 million with an additional 5.5 million non-national residents, with a median age of 25.3 years (CIA, 2011). This population growth has been reported to be the highest in the world and has outpaced the current systems, particularly in the field of education. This growth creates the need to recognize the effect of utilizing technologies along with public programs to shape the expansion in educational that potentially fosters all segments of the learning society (Al-Khalifa, 2009; Brigham, 1992).

In analyzing the effects of learning technology with regard to e-learning and examining the potential failure of education policy, the existing academic services are said to be inadequate and incapable of fulfilling the Kingdom's requirements (O'Connell & Phye, 2005). To attain the educational standards that most countries follow, the Saudi higher education requires the investigation of the effect of a definite learning tool on student thinking. With this goal, Saudi universities are seeking approaches for improving the educational system in which students can process an adequate level of thinking.

Thus far, little research has examined the effect of using web learning services on the students' thinking in Saudi universities. In recent years, the Kingdom has been investing in integrating Web 2.0 tools to be regularly used by university students, while simultaneously implementing sophisticated learning systems to improve educational achievement. This action emphasizes that the Saudi government has been preparing to create an educational system in anticipation of the projected future population growth. In updating or renovating the current education system, the Kingdom would have to state the effect of using technology to accelerate changes that could significantly benefit the students, such as the effect of using technology on their thinking skills, problem solving, and communication.

2.2 Overview of the Issues in Education

Bringing the level of higher educational standards in the Kingdom into the demands of the 21st century is essential. As Aldhafeeri, Almulla, and Alraqas (2006) indicate, "Students in the 21st century should meet high standards that enable them to demonstrate a sound understanding of the nature and operations of technology" (p. 72).

The Kingdom of Saudi Arabia continues to emphasize the traditional classroom style lectures, although the idea of online lectures is becoming acceptable for policy makers (Al-Shehri, 2004). With the recent growth of the country and the increased number of students in universities in Saudi Arabia, a new approach for providing the required learning facilities that will be integrated in these universities as an