USING TWITTER AS AN INSTRUCTIONAL TOOL: A CASE STUDY IN HIGHER EDUCATION

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ABSTRACT
The implementation of Web 2.0 technologies and related research studies are in their early stages. Therefore, this study addresses the utilization of the most commonly used microblogging website, Twitter, in a higher education course. Study participants (n = 48) filled out a quantitative survey before, during, and after participating in a course that utilized Twitter as an instructional tool. At the end of the course, the participants responded to eight open-ended questions about the process and idea of using Twitter. The study result showed that the participants increased their uses of Twitter for learning purposes. The participants' ideas of using Twitter as a teaching or learning tool progressed during the course. They also remarked about the possible negative effects of Twitter in instruction.
Keywords: microblogging, Twitter, Web 2.0, higher education, teaching, learning

INTRODUCTION

Web 2.0 technologies have infused daily life and spread through many organizations, including educational institutions. However, educators are still not sure how these technologies will affect their students or how students perceive these technologies within an instructional framework (Caruso & Salaway, 2008). Due to rapid developments in information and communication technologies, Web 2.0 tools such as blogs, wikis, photo and video sharing sites, and social networking forums have grown quickly all across the Internet. Microblogging sites such as Twitter are particularly popular around the world. People from different countries and socio-economic backgrounds connect to Twitter to interact, and new mobile technologies are constantly being adapted, making Twitter a common part of daily activities. This article concentrates on the use of Twitter as an instructional tool in a higher education course. The researchers designed a case study using a course in which Twitter was implemented and documented changes in students' ideas about Twitter over time.

Theoretical Background

Web 2.0 Technologies

Although many countries have put a significant effort into adapting educational institutions to technological innovations, some countries still likely undervalue the significance of these innovations (OECD, 2010). Additionally, "we still have a long way to go in understanding methods of effective practice" (Greenhow, 2009, p. 10) with regard to technologies. From their initial appearance, Web 2.0 tools have been highly developed. Their natural potential is reflected in education as well. For example, Web 2.0 technologies facilitate online learning by increasing interactivity, active participation, and feedback mechanisms (Harrison & Thomas, 2009).

Tim O'Reilly first introduced the concept of Web 2.0 in 2005. He has emphasized that Web 2.0 technologies are more oriented to participation by indexing information in the form of tags. Likewise, Web 2.0 technologies can be characterized as controlling the web through participation with respect to the construction and distribution of information (Siemens & Tittenberger, 2009). Furthermore, they provide a shift in focusing on information practical to people, facilitating interaction. Selection of information is as important for users as its collaborative creation (Todd, 2008).

Web 2.0 technologies have played a role in the establishment of many online communities. For instance, Flickr, Facebook, and Delicious have guided the development of large-scale groups that address a variety of technological contexts, interests, and cultural backgrounds. Using Web 2.0 technologies, these communities create their own regulations and cultures (Drula, 2009). These technologies have also blurred the borders between publicity and privacy, altering existing relationships. Therefore, the learning process must be re-defined accordingly, no longer bound by time and place but a lifelong journey (Huijser, 2008). In comparison to traditional web technologies, Web 2.0 caters to more personal needs of users. In that sense, Web 2.0 technologies lead to more collaboration than previous tools (Fu, Liu, & Wang, 2008), facilitating self-

expression, communication, and interaction via the Internet (Office of Communications, 2008). Furthermore, Web 2.0 tools allow people to access information quickly over the Internet via established friendships (Thelwall, 2008).

Higher education systems are in the process of transforming their fundamental structures (Siemens & Tittenberger, 2009). The importance of lifelong learning has been perceived as an essential instructional approach, so the central role of new technologies, including Web 2.0 tools, has caught the attention of shareholders (Friedman & Friedman, 2008). Potential uses of these technologies must be analyzed by current researchers and designers in terms of their new roles in education (Owen & Moyle, 2008). Educators must decide how to deal with Web 2.0 innovations: abandon them, support them, or control them (Huijser, 2008). Ignorance of these technologies will cause many disadvantages going forward. Understanding and predicting human behavior is extraordinarily complicated; however, conducting scientific studies is more useful than guesswork (Severin & Tankard, 1997). Therefore, more research studies of Web 2.0 technologies must be conducted for a better understanding of their use in education and what steps should be taken next.

Harris and Rea (2009) have summarized the advantages and disadvantages of utilizing Web 2.0 in an educational context. With these tools, (a) students become active elements in the instruction process, (b) the borders of classrooms extend outwards to include the entire world, (c) cooperative learning occurs, and (d) students can access knowledge whenever they want. These tools also bring some challenges to classrooms: (a) learning becomes highly dependent on computers and related technologies, (b) web resources are exposed to potential abuse by bullies, (c) plagiarism could occur, and (d) the publicity of students' work could create a certain level of discomfort.

Twitter as a Microblogging Website

Microblogging websites allow members to post 140-character messages to the public. Once a user registers on a microblogging website such as Twitter, other users can follow him or her; whatever is shared is generally visible to all users. Mobile technologies for microblogging applications have increased the use of Twitter. Kaplan and Haenlein (2011) stated that microblogs have already taken their place among Web 2.0 technologies, but it is strange that microbloggers like an application with strict character limitations. They propose three possible reasons for its popularity: (a) microblogging sites keep users updated about what is going on around them, (b) they allow users to read and share messages publically with greater ease than private social networking sites, and (c) they allow for both online exhibitionism and voyeurism for active microbloggers and passive readers.

Established in 2006, Twitter has become one of the most popular microblogging websites in the world. Bozarth (2010) defines Twitter as "email 2.0" (p. 25). A user can send a 140-character message (a tweet), forward other users' tweets (retweet), mark other users' tweets with the @ sign (tag), reply to tweets, send direct and private messages to other users, create lists of users, and publicly identify usernames in tweets by including the @ sign (mentions). Chen (2011) conducted a uses and gratification study of Twitter and concluded that as Twitter members spend more time there, they become addicted and feel more satisfied with its features. She also pointed out that Twitter helps people fulfill a basic human need: communicating with other people.

Instructional Use of Twitter

Twitter also offers many opportunities for researchers. Ovadia (2009) has specified that since Twitter maintains tweets in chronological order, it offers a great platform for designing and conducting academic studies, especially in social and behavioral sciences. As Fox and Varadarajan (2011) observed, research opportunities on the use of Twitter for educational purposes are still emerging. Most research has been conducted on Twitter in K-12 settings; thus, more studies should focus on its instructional use in higher education.

Researchers and educators have tried to investigate the integration of Twitter into the learning process by forming a community or orchestrating activities in class (Galagan, 2009). Junco, Helbergert, and Loken (2011), for example, used Twitter in a first year seminar for 125 pre-health professional majors to investigate the effects of Twitter. They concluded that Twitter has the potential to increase engagement and mobilizes students to actively participate when used as a part of the learning process. There was also an apparent increase in the grades of the experimental groups. Twitter adds educational value while generating social networks between instructors and students, yielding alternative ways to participate and communicate (Minocha, Schroeder, & Schneider, 2010).

In another study on using Twitter to enhance social presence in online instructional design and technology courses, several benefits were determined: (a) it provides quick help for students' issues, (b) it develops students' writing skills, (c) it helps them gain respect from their followers, (d) it yields participation to a

community of practice, (e) it generates informal learning activities via self-directed and independent learning, and (f) it allows for on-going relationships even after the course ends (Dunlap and Lowenthal, 2009). Besides instructional benefits, possible drawbacks of Twitter should also be taken into consideration by using it in instructional situations.

Fox and Varadarajan (2011) used Twitter in a multi-campus pharmacy management course to understand the positive and negative aspects of the microblogging as well as its effectiveness among students in terms of interaction. According to their results, most students felt that Twitter facilitates learner-learner interaction and encourages class participation, discussion, and attendance. However, they stressed the negative effects, especially highlighting how Twitter can be distracting or overwhelming.

RESEARCH METHOD

When investigating real-life phenomenon in an in-depth manner, the case study method is one of the most suitable research options (Yin, 2009). The researchers investigated the very new use of Twitter within an instructional context at a private university in Turkey. Within the case study, the researchers utilized both quantitative and qualitative data gathering techniques. Furthermore, participants filled out a quantitative survey three times: before, during, and after implementation. Qualitative open-ended questions were utilized to complement the quantitative data results. Lastly, the Twitter account was analyzed by a special website for gathering usage statistics.

Research Questions

This study focused on the idea that easily accessible microblogging sites can be transferred from daily use to instructional use, benefitting the learning process. Thus, research investigated how a microblogging website can be used as an instructional tool to identify its advantages and disadvantages. Due to its popularity, the researchers selected Twitter. This study answers the following four sub-questions:

- What are the students' general perceptions of using Twitter in a learning-teaching context?
- Is there a change in the students' use of Twitter over the three phases of the course?
- How do the students perceive Twitter as a daily tool and as an instructional tool?
- What are students' experiences using Twitter in a learning activity?

Participants and Context

The IS 204 - Computer Applications in Social Sciences course was offered in the International Relations department at a private university in Turkey. Data were collected from 48 enrolled students (26 females, 54%; 22 males, 46%). The course was held for 4 hours per week in the 2010-2011 spring semester. One of the authors was the course instructor, who provided instruction in English at a computer laboratory over 14 weeks. The course covers a general overview of the Microsoft Office suite: word processing using Word, spreadsheets in Excel, presentations with PowerPoint, and databases in Access. Course assessment criteria included a midterm examination (25%), final examination (35%), homework (20%), attendance (10%), and presentations (10%).

During the first week, students who already had Twitter accounts were required to follow the account for the course (http://twitter.com/IKUIS204). The instructor explained how to use Twitter and its features, such as mentions and retweeting, and students were encouraged to practice. Each week, four students were responsible for posting a topic on both their personal accounts and the course account, where the rest of the classroom would tweet on the topic. Topics were related to computer sciences and approved by the course instructor before posting. Each Sunday, a new group submitted a topic, and the previous group prepared a report including tweets students submitted (in Word) and the number of tweets per student (in Excel).

To assist with counting tweets, students had to add @IKUIS204 to the beginning of their tweets, which could be sent whenever and wherever they wanted. Students were free to access their accounts during class, and the instructor checked the course account to provide feedback as needed. Additionally, during the week, the course instructor replied to the chosen topic and encouraged students to tweet their own responses.

Data Sources

The main data sources of this study were surveys developed by the researchers. Statistics obtained from TweetStats (http://tweetstats.com/), which provides data about Twitter activity and user preferences and actions, were used as a supplementary data source. The quantitative data were strengthened by the analysis of qualitative open-ended questions. The quantitative survey had three parts. The first part asked for each respondent's gender and whether the respondent possessed a Twitter account. The second part encompassed the students' use of Twitter and its features, the number of people each student followed, the number of followers for each student,

and the students' access preferences and competency levels. The third part of the survey consisted of 19 questions about Twitter usage in instruction. The survey was developed after an extensive review of the literature and Web 2.0 scales used in other contexts. The instrument was also evaluated by two experts in the instructional technology field for content and face validity. The qualitative data consisted of 7 open-ended questions developed to investigate advantages and challenges of using Twitter for instructional purposes. Qualitative data analysis provided in-depth knowledge for the study.

Data Collection and Analysis

The quantitative survey was administered three times during the course (Phase I, Phase II, and Phase III) with the aim of revealing changes in Twitter usage during instruction. In Phase I, data were collected in the first week of the course. Phase II was implemented in week seven, halfway through the semester. The survey was conducted in week 13, and the open-ended survey was implemented in week 14, during the final exam. The quantitative data for each phase were analyzed using descriptive statistics, while the questionnaire items were analyzed with a one-way repeated measure ANOVA. Before these analyses, five questionnaire items (items 14, 26, 29, 31 and 32) were re-coded due to negative meanings. Cronbach's Alpha Coefficient was used to check the internal consistency of the scale for each phase; the values for Phases I, II, and III were .88, .90, and .84, respectively, suggesting very good internal consistency.

For the open-ended questions, the researchers used content analysis for both qualitative data reduction and identifying core consistencies and meanings. To identify themes, data sets were analyzed line by line to determine how frequently categories related to the research questions appeared. Afterwards, the data for each open-ended question were grouped under the main themes and categories. These qualitative coding procedures, theme and category derivation processes, and quantification of determined categories were shared and discussed among the researchers. Percentage agreement (Miles and Huberman, 1994) and Cohen's Kappa were used to assess inter-rater agreement. The initial inter-coder reliability was 77%. After reaching a consensus on codes, the final agreement was 98%. Cohen's Kappa value was 0.95, which indicates very good agreement between coders (Pallant, 2007). In order to enhance the quality and credibility of analysis, a synthesis of qualitative data and processes followed when drawing conclusions were reviewed and discussed by the researchers.

RESULTS

Participants and Twitter Usage

Most of the students (n =3 2) had Twitter accounts at the beginning of the semester (Table 1). Fourteen students created accounts Twitter in Phase II, while two students never joined. It is possible to assert that students' Twitter usage increased gradually as the course progressed.

Table 1: Twitter Account Possession

	Phase I	Phase II	Phase III
Yes	32	46	46
No	16	2	2

Table 2 summarizes the students' changing ideas about Twitter's options and features. Apart from sharing photos and web addresses, each phase saw a rise in use. Table 2 shows that the sharp increase in the use of retweets and direct messages continued across all phases.

Table 2: Usage of Twitter and Its Features in Phases I, II, and III

	Phase I			Phase II			Phase III		
Twitter Options and Features	Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know
I use "@Mentions"	24	6	2	31	10	1	38	7	1
I use "Retweet"	16	11	3	31	11	-	40	6	-
I use "Lists"	19	11	2	30	11	2	33	12	1
I use "Direct Messages"	14	13	2	35	7	1	40	5	1
I share photos	13	14	5	20	23	-	19	22	4
I share web links	13	15	4	24	17	1	29	13	4

In addition to the increased use of options and features, the more students used Twitter, the more followers they gained and the more people they followed. Moreover, there was an observed increase in both the number of followers and the number of people being followed. The increase in the number of followers is an indication of students' elaborations on Twitter, which might reflect on its instructional use. As students followed others who

might be knowledgeable on a specific topic, the probability of learning occurring increased by means of shared and created knowledge capital between the followed people and students.

Table 3: Number of People Students Follow and Their Followers in Phases I, II, and III

	Phase I		Phase II		Phase III	
Number of People	Follows	Followers	Follows	Followers	Follows	Followers
10 or fewer	4	4	3	2	2	1
11-30	11	15	6	6	5	6
31-50	12	10	19	23	10	9
51-70	2	2	7	7	14	19
71-90	-	1	2	2	4	4
91-110	2	1	1	2	2	3
111-130	2	-	2	-	3	-
131-150	-	-	1	1	2	1
More than 151	-	-	3	1	3	3

According to the statistics obtained from TweetStats, most tweets were sent on Fridays (the day of the course) and Sundays (the day the topic was posted on Twitter). Moreover, students favored sending tweets between 9:00 p.m. and 1:00 a.m, explaining why home was the most preferred access place for all phases (Table 4). Mobile phones and schools were also selected as Twitter access places. Also, the course instructor allowed students to access their Twitter accounts to ask questions and share ideas about weekly course topics during class.

Table 4: Students' Twitter Access Preferences in Phases I, II, and III

Access Places	Phase I	Phase II	Phase III
Home	32	41	45
School	20	35	39
Dormitory	3	4	4
Work	1	3	3
Internet Cafe	3	6	8
Mobile Phone	15	27	33
Friend's Computer	2	7	15

Table 5 demonstrates that students' perceived competency levels also increased. Most students believed that their competency level was good or very good by Phase III, but it is not possible to infer any variations in Phases I and II. According to statistics, 235 tweets were sent in April, while 110, 176, and 8 tweets were sent in February, March, and May, respectively, which might explain these changes.

Table 5: Twitter Competency/User Level

Level	Phase I	Phase II	Phase III
Poor	6	4	3
Fair	6	5	5
Good	14	25	18
Very Good	2	5	16
Excellent	2	5	4

Twitter Usage in Instruction

The Survey

According to @IKUIS204 statistics, the average number of tweets for the entire class was 9.4 per day and 132 per month during the course. Descriptions, means, and standard variations of the survey items are listed in Table 6 in accordance with the questionnaire format and phases.

Table 6: Mean Scores and Standard Deviations of Twitter Usage in Instruction Items

No.	Item	Phase I		Phase II		Phase III	
		M.	S.D.	M.	S.D.	M.	S.D.
1	I define myself as anti-Twitter.	2.45	1.30	2.06	1.27	1.75	0.95
2	Twitter could be a good learning tool.	3.06	0.95	3.60	0.76	3.81	0.81
3	Twitter could be a good teaching tool.	3.25	0.83	3.56	0.76	3.87	0.70
4	Twitter could be integrated in a university for teaching-learning.	3.31	1.11	3.64	0.93	4.00	0.68
5	Twitter should be integrated in non-formal education.	3.02	1.08	3.50	0.98	3.81	0.81

No.	Item	Phase I		Phase II		Phase III	
		M.	S.D.	M.	S.D.	M.	S.D.
6	Twitter could be used as a supplementary medium for instruction.	3.12	1.10	3.58	1.02	3.85	0.77
7	Using Twitter could make learning more enjoyable.	3.41	1.18	3.70	0.98	4.18	0.76
8	Twitter could serve as a learning tool by allowing learners to share their personal experiences.	3.68	1.14	3.97	0.83	4.16	0.63
9	I would like to contribute to discussions on Twitter.	3.35	0.99	3.83	0.90	3.79	0.68
10	Using Twitter to participate in group discussions could be very exciting to me.	3.19	1.10	3.54	1.12	3.68	0.87
11	I have no fear of using Twitter to communicate with other people.	3.83	0.78	4.00	0.85	4.37	0.81
12	I feel confident in my ability to clearly express my ideas on Twitter.	3.35	1.21	3.89	0.95	4.06	0.80
13	I'm afraid that my ideas on Twitter could be used without my permission.	4.06	1.41	2.06	1.00	2.72	1.10
14	I believe that Twitter will be used at schools in the future.	3.00	1.31	3.31	0.92	3.52	0.94
15	Student tweets during a course may increase the course's effectiveness.	3.08	1.39	3.83	1.07	4.14	1.01
16	Sending tweets during a course may distract attention.	4.04	4.65	2.75	1.31	2.58	1.25
17	I believe that Twitter may have an effect on community structure.	3.12	1.37	3.37	1.00	3.50	1.03
18	I believe that Twitter intervenes in private life.	3.10	1.05	2.16	1.07	2.22	0.95
19	I do not understand the people writing Tweets all the time.	3.52	1.36	3.41	1.51	3.35	1.52

The participants' belief in Twitter's possible power as a teaching and/or learning tool increased as time elapsed over the semester. Additionally, the participants emphasized that Twitter should be integrated into both non-formal learning settings and formal university settings, mostly as supplementary material. The participants agreed that Twitter has the potential to make classrooms more enjoyable settings. However, although the mean score slightly increased, the participants still did not totally agree on Twitter's future place in schools. The participants believed that sending tweets about personal experiences or ideas could be an effective way of creating knowledge and learning. According to the mean scores, the participants were comfortable tweeting their personal standpoints on Twitter. As participants spent more time on Twitter, their self-confidence in expressing themselves increased; more specifically, the mean scores show that the participants overcame their fears of being bullied about their tweets. The mean scores demonstrate that participants agreed that Twitter increased course effectiveness. Moreover, as participants practiced using Twitter during the course, the mean scores relating to distraction decreased, though participants might understandably find it difficult to send and read tweets while following instruction in class. With more practice, the degree of feeling distracted might lessen. The participants appeared to be neutral about Twitter's effect on altering communities, and they somewhat disagreed that Twitter could disturb people's private lives.

The differences in perspectives on Twitter usage in instruction between Phases I, II, and III were statistically checked by a one-way repeated measures ANOVA for each item. Table 7 demonstrates 14 significantly different items and the results of the test values.

Table 7: Significantly Differing Items

No.	Item	F	*P*	η^2
1	I define myself as anti-Twitter.	5.14	.010	.18
2	Twitter could be a good learning tool.	8.75	.001	.27
3	Twitter could be a good teaching tool.	7.81	.001	.25
4	Twitter could be integrated in a university for teaching-learning.	7.21	.002	.23
5	Twitter should be integrated in non-formal education.	9.12	.000	.28
6	Twitter could be used as a supplementary medium for instruction.	8.30	.001	.26
7	Using Twitter could make learning more enjoyable.	8.63	.001	.27
8	Twitter could serve as a learning tool by allowing learners to share their personal experiences.	3.69	.033	.14
9	I would like to contribute to discussions on Twitter.	3.35	.044	.12
11	I have no fear of using Twitter to communicate with other people.	6.20	.004	.21
12	I feel confident in my ability to clearly express my ideas on Twitter.	5.93	.005	.20
15	Student's tweets during a course may increase the course's effectiveness.	7.94	.001	.26

16	Sending tweets during a course may distract attention.	4.57	.016	.17
18	I believe that Twitter intervenes in private life.	11.60	.000	.33

After 14 significantly differing items were identified through a one-way repeated measures ANOVA test, the effect size values were calculated to assess the importance of these differences. The partial eta squared values fluctuated between .14 and .33 (Table 7) for the significantly differing items, indicating a very large effect size.

For items 1, 3, 4, 5, 6, 8, 9, 11, 12, and 16, there was a significant difference across all phases. From the mean scores, one can conclude that as the students practiced using Twitter in an instructional setting, they became more acquainted with its advantages as a supplementary teaching tool in higher education institutions. Moreover, the students seemed more willing to participate in discussions on Twitter in terms of sharing their own perspectives over time. Their self-reliance on communication via Twitter was accounted for in all phases. For item 2, which focused on the role of Twitter as a learning tool, significant differences were observed in Phase I-Phase II and Phase I-Phase III. Participants' opinions on the role of Twitter as a learning tool did not change significantly until the end of the course. For item 7, which focused on the fun Twitter added to instruction, significant differences were observed in Phase I-Phase III and Phase II-Phase III. Between the first week (Phase I) and midterm week (Phase II), participants tried to discover the effects of Twitter on instructional activities and may have missed its enjoyable side. On the other hand, after the students used Twitter more, they discovered its positive effects. For item 15, focusing on using Twitter as a tool to increase effectiveness, significant differences were observed in Phase I-Phase II and Phase I-Phase III. After the mid-term exam, the students felt the effects of Twitter's ability to increase the quality of the course. For item 18, which focused on Twitter's interference in private life, significant differences were observed in all stages: The participants disagreed in all phases about Twitter's intrusion into people's personal lives.

Open-Ended Questions

Question1: For what other purposes could Twitter be utilized within the course? What are your recommendations?

The participants focused on two major themes, communication and sharing information, and had many recommendations: discussions (n = 5), making comments (n = 3), arranging appointments (n = 3), and following current news (n = 2). The participants also listed items to share on Twitter such as deadlines for homework (n = 4), grades (n = 4), exam topics (n = 4), fundamental points about the course (n = 3), questions about homework (n = 3), weekly course schedules (n = 3), activities (n = 2), personal experiences (n = 2), short summaries (n = 2), software (n = 2), reinforcement for students (n = 1), links to encourage research (n = 1), conferences (n = 1), lecture notes (n = 1),and videos (n=1). One student explained:

> The main difference between Twitter and Facebook is that Twitter could provide many advantages. Especially when we look at the last revolutionary movements in the Middle East, we can see its great effects. Outside of the course, we can chat on political, economic, social, and sports issues.

Question 2: Which aspect(s) of Twitter do you like?

The participants identified many positive aspects of Twitter. Twelve students emphasized how it makes self-expression easy. Similarly, eight students pointed out that Twitter is a good tool for sharing knowledge simultaneously. The participants specifically paid attention to the ability to follow celebrities (n = 6), other Tweeters (n = 6), course content (n = 3), different websites (n = 2), and friends (n = 2). The participants liked Twitter's communication options (n = 3), direct messaging (n = 5), mentions (n = 4), retweeting (n = 3), sharing photos (n = 2), and customizable color and background (n = 1). One participant wrote:

> With the Mentions feature of Twitter, I can follow when my friends make a comment about me. I can learn the ideas of celebrities, authors, and my friends regarding politics, economics, and cultural issues. I feel happy when I see that some people retweet my ideas on their profiles.

The participants also concentrated on the technological structure of Twitter. Some participants (n = 2) indicated that Twitter is better than Facebook. The students also noted that Twitter is speedy (n = 4), easy to use (n = 3), and interactive (n = 3), allowing members to block unwanted contacts (n = 3) and lock their tweets (n = 1).

Finally, the participants considered Twitter's social aspects. One participant stated that Twitter is a good place to analyze a person's true characteristics and agenda. Similarly, another participant focused on Twitter's role in arousing curiosity about what is written by followers. The participants specified that Twitter is a funny tool (n = 4) that provides a social context (n = 2) to meet new people (n = 1).

Question 3: Which aspect(s) of Twitter don't you like?
For this question, participants focused on two themes: technical issues and human-related challenges. They complained about unnecessary tweets (n = 14), abuse of human relationships (n = 4), fake accounts (n = 3), and spending too much time on Twitter (n = 1). The participants criticized Twitter's functional errors (n = 6), including overcapacity (n = 3), visual design (n = 2), the 140-character limitation (n = 4), difficulty sharing photos (n = 4), and limited language options (n = 2). One participant compared Twitter to Facebook, noting that there is no "Like" option, and another felt that Twitter is not as detailed as Facebook.

Question 4: What did you like most about utilizing Twitter within the course?
Answers were centered around two themes: management of instruction and teaching. The students were glad to follow grades and homework (n = 5) and course content (n = 4) on Twitter. They pointed out that Twitter made instruction funnier (n = 16) and increased in-class communication (n = 8), participation (n = 6), communication with the instructor (n = 5), attention to the course (n = 5), and course interactivity (n = 5). The participants were happy to share ideas (n = 10), to tweet during class (n = 8), and to discuss course topics (n = 5).

Question 5: What didn't you like about utilizing Twitter within the course?
Twenty students complained about unnecessary tweets. Moreover, ten students noted that sending tweets during class was distracting. Two students were not pleased with the obligatory contact with other students. Lastly, three participants specified disappointment with jokes in tweets.

Question 6: What problems did you experience while utilizing Twitter within the course?
The participants concentrated on two themes: Twitter-related and instruction–related. Examples of Twitter-related problems included delayed uploads of tweets (n = 5), functional errors when opening Twitter (n = 3), the restriction to 140 characters (n = 1), following people (n = 1), organizing a personal profile (n = 1), password problems (n = 1), use of mentions (n = 1) and tagging people (n = 1). For instruction-related problems, the participants focused on Twitter's distracting effects (n = 7), unnecessary tweets (n = 4), and its obligatory use in the course (n=1).

Question 7: Do you want to continue using Twitter for teaching/learning purposes after the course? Why?
Twenty-eight participants were eager to use Twitter for instruction in prospective courses because they can share course content (n = 13), communicate with others (n = 3), ask questions (n = 2), stay updated (n = 2) and follow assignments (n = 1). Moreover, Twitter is an important medium (n = 2) that is enjoyable (n = 2) and more suitable for education than Facebook (n = 1). Two participants emphasized that how people use Twitter in an educational setting must be parallel with course objectives, and one participant stressed that students should not use Twitter during instruction. However, two students were hesitant about using Twitter in education, and fourteen students were against it. Four participants stated that other instructors would not use Twitter in their courses. Three participants found Twitter unnecessary for education, while two others believed it is not beneficial. Other reasons stated by participants included distractions (n = 1), the 140-character restriction (n = 1), and privacy issues (n = 1).

Limitations
This study is limited by several conditions. First and foremost, this limited sample of Twitter users is not necessarily representative of all Twitter users. Secondly, the study is limited to explore impacts on learning outcomes being expected students to demonstrate after the course. Thirdly, the relationship between microblogging, fun, and learning is not fully investigated through the study. Another limitation is that the data relies on the instruments used in the study. Interviews to obtain in-depth information about the purpose of the research might have additional insight. Moreover, the following limitations are also relevant to the study: (a) the validity of this study is limited to the reliability of the instruments, (b) validity is limited to the honesty of the participants' responses to the study instruments. Lastly, this study was realized with a specific group of students using a specific microblogging website, Twitter. Hence, study results are highly dependent on this context. Therefore, the same study should be replicated within other contexts for further investigations in order to validate the findings.

DISCUSSION AND CONCLUSION
This research study was conducted with the purpose of using the microblogging website Twitter as an instructional tool in the Computer Applications in Social Sciences course offered by the International Relations department of a private university. The students' experiences using Twitter in a learning-teaching context were tracked over three periods. The study results suggest that Twitter could be used as part of the instructional process in higher education. Furthermore it is possible to assert that the more students are engaged with Twitter

in a learning context, the more they will use its options and applications for both personal and instructional purposes.

Although students' satisfaction with Twitter's features and applications can be explained by the frequency of usage (Chen, 2011), other factors also play a fundamental role in ensuring effectiveness in educational settings. First, educational environments might be more enjoyable with the integration of Twitter. As noted in the results, Twitter adds more fun to instruction, especially integrated in daily activities. Second, Twitter allows students to create and share knowledge easily (Bozarth, 2010). Because Web 2.0 tools help people obtain information quickly (Thelwall, 2008), the sharing and creation of knowledge for instructional purposes also increases the effectiveness of instruction. Third, students can communicate easily and efficiently with each other and with their instructor about course content, assignments, and grades via applications such as @Mentions, retweets, lists, and direct messages. These options strengthen the self-confidence and self-expression of students in discussions (Dunlap & Lowenthal, 2009). While participating in discussions on Twitter about their perspectives and experiences, students can overcome their fears and be a part of the classroom community (Bozarth, 2010). These favorable factors should be investigated more deeply to determine the exact roles and correlations of effective instructional implementation of Twitter in educational settings.

In addition to these positive factors, educational researchers should focus on potential adverse effects of Twitter in instructional environments, as well. Most complaints were about unnecessary tweets during instruction. Dunlap and Lowenthal (2009) have warned that these drawbacks can lead to distraction. Fox and Varadarajan (2011) reported similar cases and concluded that Twitter could be distracting and overwhelming even when used properly. Therefore, studies that reveal precautions instructors should take during instruction are highly needed, as there is currently no model for using Twitter or other Web 2.0 tools in education, especially higher education (Greenhow, Robelia, & Hughes, 2009).

Sorensen and Skouby (2009) have predicted that mobile technologies will increase the significance of microblogging websites. As clarified in this study, students' Twitter access preference is consistent with their preference to access Twitter at home and at school. Since the use of mobile technologies in schools and societies has become increasingly pervasive, studies that focus on effective and efficient use of Twitter in educational settings might address the question of how students' use Twitter in and out of educational environments.

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