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Using Web 2.0 Technology to Enhance Knowledge Sharing in an Academic Department

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Abstract

Academic departments at colleges and universities perform various functions that involve teaching, scheduling, registration and course management. As new technologies emerge and digital culture evolves, academic departments need to decide which technologies to adopt and when to implement them in order to continue functioning effectively. Nowadays, knowledge is regarded as a strategic resource in organizations; therefore the leverage of knowledge is a key decision-making issue. Research has shown that Web 2.0 technologies such as social networks are easy to use and familiar, allowing learners to share and generate knowledge within the small group environment. This study examines the use of Web 2.0 technologies as platforms for sharing knowledge between the Industrial Engineering department of King Abdulaziz University and its students. This was done by carrying out a survey of the students, from which 77 valid responses were collected. The survey found that a significant percentage of students reported that the current knowledge-sharing process in the department, using notice boards, is acceptable and good but that it needs to improve to reach more students. Knowledge of scheduling and registration was said by the largest number of participants to be the type that they most strongly preferred to be shared. Finally, 70% of the students chose Facebook as the best platform for sharing knowledge and information between students and the department, 16% chose Twitter, 13% Google+ and 1% others.
This study is original, not only for being one of the first in Saudi Arabia, but for being one of the few to explore the use of Web 2.0 technology for sharing knowledge between an academic department and its students.

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1. Introduction

The Industrial Engineering (IE) Department is one of the largest in the engineering college of King Abdulaziz University (KAU). The department has around 220 students and more than 30 faculty members, who perform various functions that involve teaching, scheduling, registration and course management. Colleges and universities no longer simply provide knowledge to students, but also manage, blend and share such knowledge among the students. Among the challenges to be overcome in higher education is the need to increase and to improve the communication between faculty, staff and students. Currently the IE Department shares knowledge with its students by means of notice boards throughout the department. The internet era and the associated rapid technological changes have opened up new horizons and new challenges in the educational world [1]. Academic departments need to decide which technologies to adopt and when to implement them in order to continue operating effectively. Competition between universities has also led both private and public institutions to redefine knowledge as a strategic asset and source of growth [2].

Universities are implementing a range of collaborative Web 2.0 technology applications to develop students' awareness, attitudes and ability to use digital tools efficiently to identify, access, manage, integrate, evaluate, analyze and create digital resources, construct new knowledge and collaborate with others [3]. Applications such as blogs, wikis, social networking tools and video sharing tools are gaining popularity in college campuses for teaching and learning purposes [4-5]. Similarly, university students have increased their Web 2.0 presence over the years with a higher level of participation. Three-quarters of American adult users and 93% of teens have regular interactions with Web 2.0 applications, according to Jones and Fox [6], who conclude that college students may be used to using these applications to create content on the web, to contribute and to collaborate with other users. Moreover, based on data from 3000 college participants representing 1179 higher education institutions in the USA, the EDUCAUSE Center for Applied Research reports that the use of social networking sites (e.g. Facebook) increased significantly from 65.3% in 2006 to 90% in 2011. Furthermore, 87% of participants owned a laptop computer and 55% a handheld device (e.g. a web-enabled smart phone) [7].

This increase in use of Web 2.0 technology by students and universities encouraged the author to investigate their use as platforms for knowledge sharing between the IE Department and its students.

This paper reports a survey whose aims were:
- To assess the current knowledge sharing techniques in the IE Department.
- To identify the preferences of students as to what knowledge the Department should share with them (scheduling and registration; lecture location; exam time and location; cancelations; events and jobs).
- To identify the preferred social network (Facebook, Twitter, Google+) for sharing knowledge between the department and its students.
- The study is divided into four parts: literature review, methodology and data collection, results and conclusions

2. Literature review

This literature review is divided into two parts. The first reviews knowledge management (KM) and sharing in academic settings and the second discusses the use of Web 2.0 as a knowledge sharing platform.

2.1. Knowledge management and sharing in academic settings

Knowledge is recognized not only as the most important resource in organizations [8] but as one of the primary sources of competitive advantage [9]. Knowledge is critical to the long-term sustainability and success of any organization [10]. The importance of knowledge is recognised by both public and private organizations,

particularly educational/learning institutions such as universities [11]. Today there is a growing recognition that knowledge management can enable higher education to develop in an interactive and dynamic educational environment [12].

Knowledge may be broadly defined as a fluid mix of framed experiences, values, contextual information and expert insights that provide a framework for evaluating and incorporating new experiences and information [13]. Reviewing the literature reveals different approaches to defining knowledge, behind which lie different perspectives on knowledge. It is important to define knowledge, because it is the first step in the understanding of KM. Researchers have identified different types of knowledge [10]. Some of the common approaches to its definition are marked by two distinctions: between tacit and explicit approaches to knowledge; and between data, information and knowledge. The most common classification, however, is between explicit and tacit knowledge [14].

Research shows that there are also many varied definitions of KM. Davenport et al [15] argue that knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering its objectives. The knowledge to be managed includes both explicit, documented knowledge and tacit, subjective knowledge. The authors also suggest that management entails all of those processes associated with the identification, sharing and creation of knowledge. Moreover, KM demands that knowledge should be obtained, produced, shared, regulated and leveraged by a steady conglomeration of individuals, processes and information and communications technology (ICT) [16].

Coleman [6] defines KM as an umbrella term for a wide variety of interdependent and interlocking functions, including knowledge creation; knowledge valuation and metrics; knowledge mapping and indexing; knowledge transport, storage and distribution; and knowledge sharing.

Kim and King [17] suggest that the creation, sharing and dissemination of knowledge are the main activities in KM. Knowledge sharing can also be seen as a social interaction culture that includes the exchange of employees' knowledge, experiences and skills through the whole department or organization. Knowledge sharing includes a set of shared understandings related to giving employees access to relevant information and building and using knowledge networks within organizations [18].

For an organization, knowledge sharing is capturing, organizing and transferring experience-based knowledge which resides within the organization and making it available to others in the organization [1], while knowledge sharing is the exchange of experience, events, thoughts or understanding of anything. In general, people's expectations of knowledge sharing are to gain improved insights and understanding, thereby improving learning and expertise.

Now, if we relate these concepts to the academic context, we realize that one of the most important KM process concerns knowledge sharing mechanisms. Many researchers have discussed KM in education, but few have examined knowledge sharing, especially between academic departments and their students.

Advances in ICT have revolutionized the education field by opening new avenues of learning and knowledge sharing. Students today are blessed with a wealth of information for their studies and research, in comparison with the pre-ICT period, especially following the explosion of the World Wide Web, which is one of the most effective and convenient ways to find and distribute information. These technologies underpin the foundation and significance of information and knowledge sharing among learners worldwide [19].

2.2. Web 2.0 technology

Macaskill and Owen [20] define Web 2.0 as a 'web-based platform which allows users to gain access, contribute, describe, harvest, tag, annotate and bookmark web mediated content in various formats, such as text, video, audio, pictures and graphs', while Stuart [21] defines Web 2.0 tools simply as sites which share stuff. Alternatively, Web 2.0 is referred to as the 'social web' [22] or the 'read/write web' [23], referring to a range of software applications that have been variously described as 'dynamic' 'interactive' 'democratic', 'people

centric', 'volatile' 'social' and 'adaptive'. Web 2.0 differs from its predecessor, Web 1.0, in that its content is no longer defined by those with programming or web design knowledge. Anybody with minimal web skills can contribute to Web 2.0.

Some of the more popular Web 2.0-based websites are Flickr, which can be used to share photographs, YouTube for sharing videos, Last.fm for sharing audio, Facebook and Twitter for sharing text-based information and social networking.

Web 2.0 tools allow users to create, describe, post, search, collaborate, share and communicate online content in various forms, ranging from music and bookmarks to photographs and documents [20,24]. The Horizon Report [25] states that users can create content via Web 2.0 tools and that social networking using mobile phones, etc. will have a considerable influence on higher education.

Chu and Meulemans [26] have reported that online social networking sites are very popular among the students. MySpace and Facebook, two widely adopted social networking sites, can be used in university libraries for imparting library instruction, reference and outreach. The OCLC study revealed that 28% of the 6545 online population surveyed were active users of social sites [27].

The literature review reveals that the use of Web 2.0 in education is increasing at an astonishing pace. Some of the experts have also asserted that that it is more of a social phenomenon than a major stride in technology. Tools like social networks may be used by colleges to improve communication and knowledge sharing with the students and staff, as well as for outreach services. The application of these tools may help colleges to offer their resources and services to users in a proactive manner.

2.3. Social Networks

Social Networks are one of the most common tools of Web 2.0 technologies. The rely on software that supports collaboration, knowledge sharing, interaction and communication among users from different places, who come together with a common interest, need or goal [28,29]. Social networks are also described as offering a range of applications that allow group interactions and form shared spaces for collaboration, social connections and information exchanges in a web-based. Facebook, Twitter, Google plus and YouTube are some of the most used social networks.

2.3.1. Facebook

Facebook was created in February 2004 by a Harvard student as a social networking web site for college students to stay in touch [30]. It gained huge success immediately. Within the first month of its creation, more than half of the Harvard undergraduate students registered for membership of the service. It was soon expanded to all Ivy League schools, then to all colleges, becoming a popular way for college students, faculty and staff to get to know other people on campus and to exchange information and ideas about university policies, events and many other things. During the next couple of years, Facebook became open to the public and membership climbed to tens of millions of active users [31].

Since the invention of Facebook at the beginning of the new millennium, there have been numerous research articles, proposals and speeches written about the seemingly unlimited potential of the social network in communication. Kosik [32] found that some students used Facebook for academic purposes, to ask classmates for information about assignments, with some stating that they preferred it to the university education software because it provided more immediate responses. Moreover, in a study by Matthews [33], a faculty member highlighted Facebook as an opportunity to directly reach over 75 per cent of his target audience. In 2007, a Facebook version of the online learning environment Blackboard was launched, allowing for 95 per cent of Blackboard's functionality to be moved into Facebook, with a new CourseFeed application providing users with a newsfeed of anything happening in their courses [34]. This was phased out in 2008 and Facebook has called on

developers to build other educational platforms, i.e. 'even more robust ways to create, connect, and collaborate around teaching and learning in the classroom' [35]. Facebook also allows the creation of groups for particular academic courses, with wall posting used to discuss elements of the course.

The company Lookabee has also launched a platform for teachers to create their own Facebook applications to keep in touch with students. This application will allow them to distribute documents such as homework assignments or course notes for later downloading by students [36].

2.3.2. Twitter

Twitter is described as a social networking and micro blogging service that users like to use for short messages of 140 characters in length [37]. The short format of the tweet is a defining characteristic of the service, allowing informal collaboration and quick information sharing that provides relief from rising email and IM fatigue. Twittering is also a less gated method of communication: you can share information with people that you wouldn't normally exchange email or IM messages with, opening up your circle of contacts to an ever-growing community of like-minded people [37]. The short format is a unique way of communicating that has captivated the creative minds of millions of users and it is an interesting method for students to keep in touch with each other as well as with the lecturer and/or the department.

2.3.3. Google Plus

Google+ is a multilingual social networking and identity tool. Unlike other conventional social networks which are generally accessed through a single website, Google has described Google+ as a "social layer" consisting of not just a single site, but rather an overarching "layer" which covers many of its online properties [38]. Google+ differ from other social network sites that it enables users to selectively share content with specific 'Circles' of people [39]. By introducing the notion of 'circles', Google+ enables users to selectively share data with specific groups within their personal network, rather than sharing with all of their social connections at once.

2.3.4. YouTube

YouTube is a video-sharing website, created in February 2005, on which users can upload, view and share videos. Most of the content on YouTube has been uploaded by individuals, although media corporations offer some of their material via the site [40].

In education, recent studies have mostly focused on how to utilize it to enhance the process of teaching with limited empirical support. Balcikanli [41] concludes that YouTube can be integrated as an effective online tool for language learning due to its ease of use and its connections to an abundance of video clips that not only teach languages, but also demonstrate the cultural contexts in which the language can be properly applied. The author believes that YouTube is an excellent platform for knowledge sharing knowledge between an academic department and students. The department can use YouTube to share videos about the department such as location, registration method and lectures.

3. Methodology

This study examines knowledge sharing between the IE Department at KAU and its students. In addition, it explores the possibility of using social networking as a knowledge sharing platform.
A survey of students was used as the data collection method and 77 valid responses were collected. The objectives of this survey were:

- To assess the current knowledge sharing techniques.
- To identify the views of students on what knowledge they wanted the department to share (scheduling and registration, lecture location, exam times and location, cancellations, event and jobs).
- To identify the preferred social network (Facebook, Twitter or Google+) for sharing knowledge between the department and the students.

4. Results and findings

Figure 1 shows responses to question 1, on year of registration at the University or the IE Department, as percentages, while Table 1 also gives the response count.
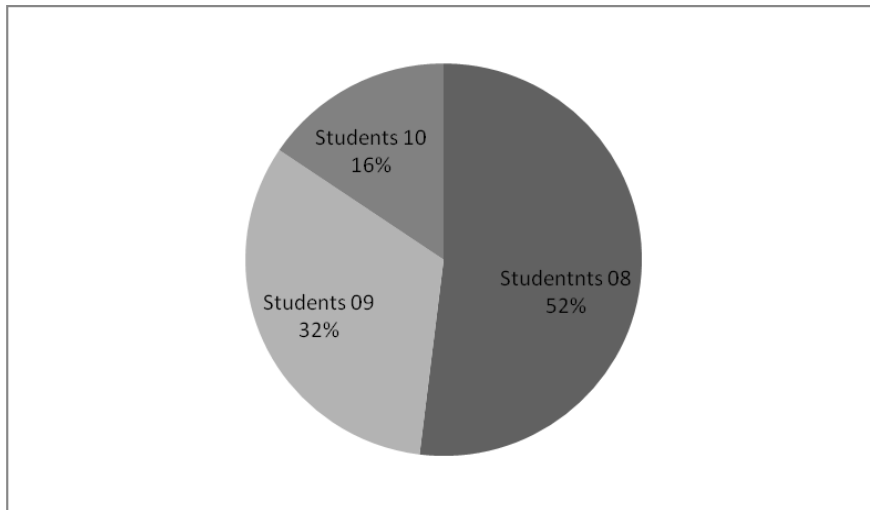

Fig. 1: Year of registration at the University or IE Department

Table 1: Year of registration at the University or IE Department

Answer Options	Response Percent	Response Count
2008	52%	40
2009	32%	25
2010	16%	12

As Table 1 and Figure 1 show, 52% of respondents had registered in 2008, 32% in 2009 and 16% in 2010.

Question 2 asked: "What is your opinion of knowledge / information sharing between the students and the IE Department?" Responses are again given in the form of a pie chart showing percentages (Figure 2) and fuller details in Table 2.
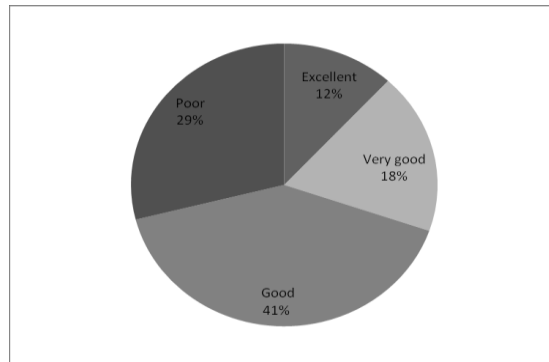
Fig. 2: Students' opinions of knowledge sharing between the students and the IE Department

Table 2: Students' opinions of knowledge sharing between the students and the IE Department

Answer Options	Response Percent	Response Count
Excellent	12%	9
Very good	18%	14
Good	41%	31
Poor	29%	22

In response to question 2, 31 students (41%) answered that knowledge sharing was good, 22 (29%) said that it was poor, 14 (18%) that it was very good and the remaining nine students (12%) that it was excellent. Responses to this question indicate that the performance of knowledge/information sharing in the Department was of an acceptable standard, but that it should improve in order to reach more students.

Question 3 asked: "How often do you read the announcements on the notice boards"? The results are shown in Figure 3 and Table 3.
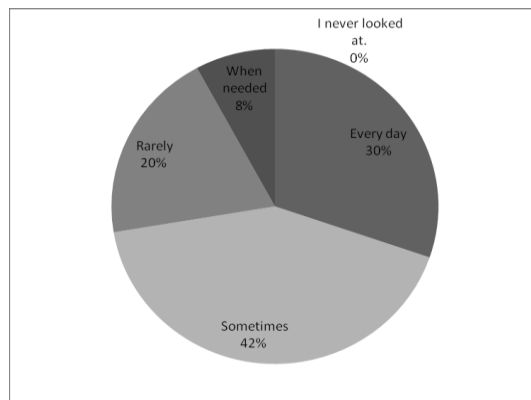

Fig. 3: Frequency with which students read announcements on notice boards

Table 3: Frequency with which students read announcements on notice boards

Answer Options	Response Percent	Response Count
Every day	30%	23
Sometimes	42%	32
Rarely	20%	15
When needed	8%	6
I never look	0%	0

As notice boards were the most common way to notify student of the announcements in the IE Department, we found that 42% of respondents sometimes looked at them, 30% replied that they looked at the boards every day for new announcements, 20% answered that they rarely did so and the remaining 8% did so when needed.

Question 4 asked: "What is your preferred method of communication? The results are shown in Figure 4 and Table 4.
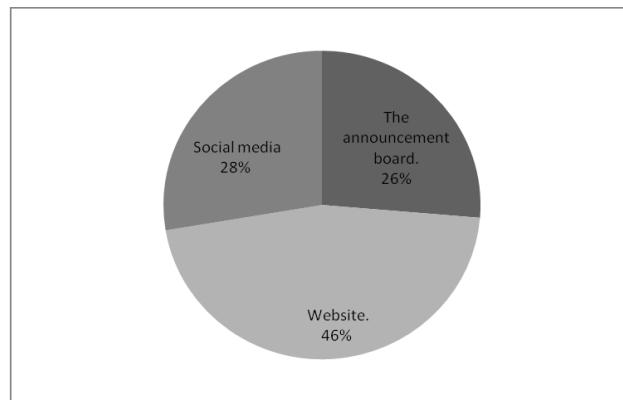

Fig. 4: Students' preferred methods of communication

Table 4: Students' preferred methods of communication

Answer Options	Response Percent	Response Count
Notice boards	26%	20
Websites	46%	35
Social media	28%	21

These responses reflect the preference of today's students for technology as a means of sharing knowledge and information, as 46% of respondents replied that they preferred websites and 28% indicated a preference for social media, while the remaining 26% chose notice boards as the best option.

Question 5 asked: "If social media were used for communication, which one would you prefer to use?" Figure 5 and Table 5 show a breakdown of the responses.
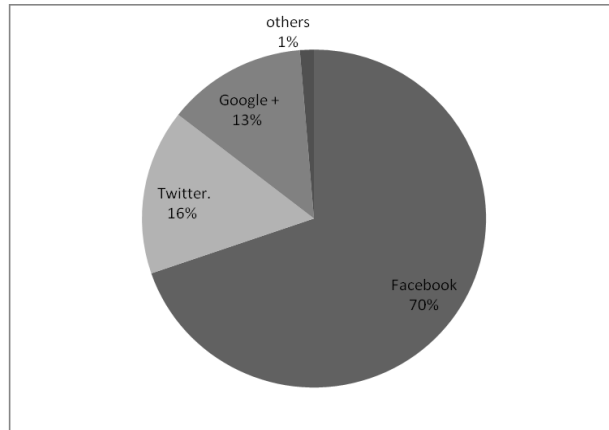

Fig. 5: Preferred social media for communication

Table 5: Preferred social media for communication

Answer Options	Response Percent	Response Count
Facebook	70%	53
Twitter	16%	12
Google+	13%	10
Others	1%	1

In response, 70% of IE students designated Facebook as their preferred social medium for sharing knowledge with the Department, 16% chose Twitter, 13% selected Google+ and the remaining 1% preferred another medium.

The remaining questions whose responses are analysed here concerned students' preferences among the same list of social media for the sharing of knowledge on particular topics, beginning with question 6, which asked: "Where would you prefer information on scheduling and registration to be shared?" Responses are shown in Figure 6 and Table 6.
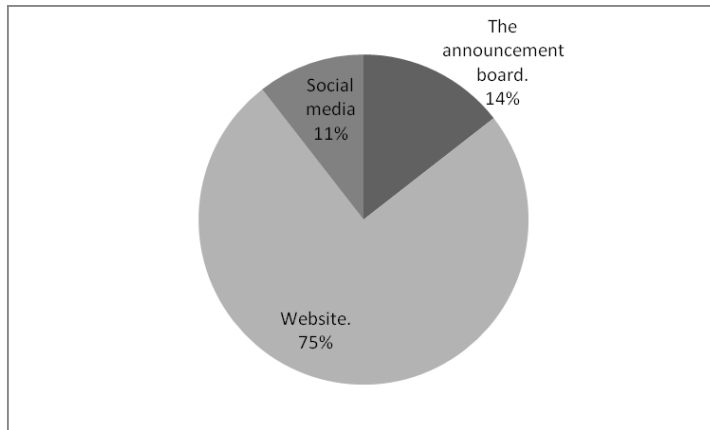
Fig. 6: Preferred communication methods for information on scheduling & registration

Table 6: Preferred communication methods for information on scheduling & registration

Answer Options	Response Percent	Response Count
Notice boards	14%	11
Website	75%	57
Social media	11%	8

There was a clear preference for a website to be used for the sharing of information on scheduling and registration, as this option was selected by 75% of respondents, while 14% chose notice boards and 11% answered social media.

Question 7 asked where respondents preferred information on lecture locations to be shared and results are given in Figure 7 and Table 7.
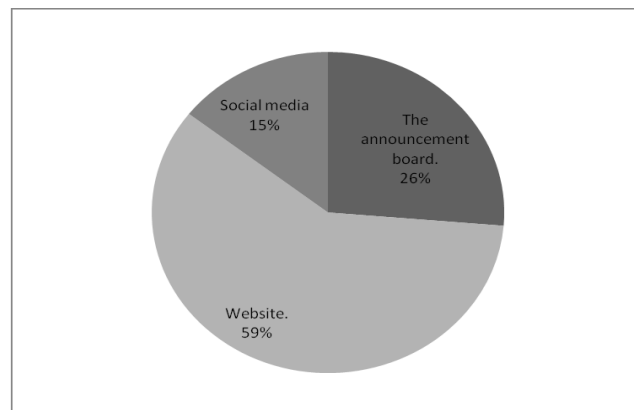

Fig. 7: Preferred communication methods for information on lecture locations

Table 7: Preferred communication methods for information on lecture locations

Answer Options	Response Percent	Response Count
Notice boards	26%	20
Website	59%	45
Social media	15%	11

Again, there is a clear preference for the website as a means of sharing information on lecture locations between students and the IE department, as this response was given by 59% of participants, while a quarter (26%) of students chose the notice board and 15% preferred social media.

Question 8 asked: "Where would you prefer information on exams to be shared?" The responses are shown as percentages in Figure 8 and Table 8.
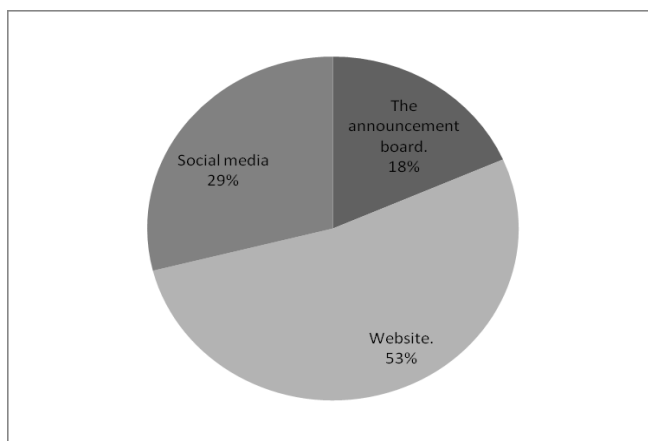

Fig.8. Preferred communication method for information on exams

Table 8: Preferred communication method for information on exams

Answer Options	Response Percent	Response Count
Notice board	18%	14
Website	53%	40
Social media	29%	22

There was again a preference for the website as a medium of communication for sharing exam information between students and the Department, chosen by 53% of respondents, while 29% chose social media and 18% the notice board.

Question 9 asked: "Where would you prefer information on cancellations to be shared?" Responses are shown in Figure 9 and Table 9.
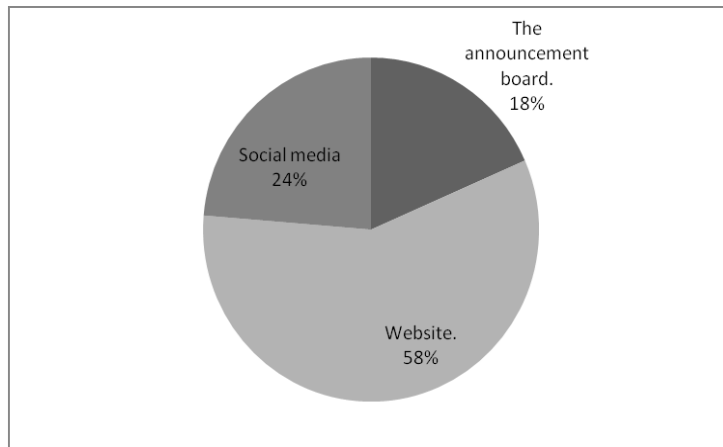
Fig. 9: Preferred communication method for information on cancellations

Table 9: Preferred communication method for information on cancellations

Answer Options	Response Percent	Response Count
Notice board	18%	14
Website	58%	44
Social media	24%	18

As with the other types of information, there was a strong preference for the use of a website for information on cancellations to be shared between students and the IE Department, as this response was given by 58% of participants, while less than half of this number (24%) opted for the social media and 18% for the notice board.

Finally, question 10 asked: "Where would you prefer information on events and jobs to be shared?" Responses are shown in Figure 10 and Table 10.
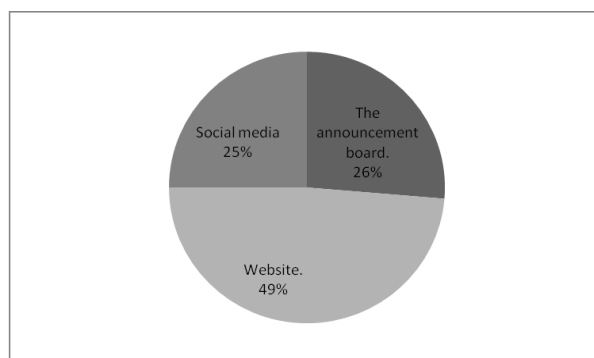

Fig. 10: Preferred communication methods for information on events and jobs

Table 10: Preferred communication methods for information on events and jobs

Answer Options	Response Percent	Response Count
Notice board	26%	20
Website	49%	37
Social media	25%	19

Responses were again more or less in line with the previous ones: 49% identified the website as the ideal means of communicating and sharing information on events and jobs, while 26% chose the notice board and 25% the social media.

5. Conclusion and further research

This study examines the use of Web 2.0 technologies as platforms for sharing knowledge between the Industrial Engineering department of King Abdulaziz University and its students. This was done by carrying out a survey of the students, from which 77 valid responses were collected.

The survey found that a significant percentage of students reported that the current knowledge-sharing process in the department, using notice boards, is acceptable and good but that it needs to improve to reach more students. Knowledge of scheduling and registration was said by the largest number of participants to be the type that they most strongly preferred to be shared. Finally, 70% of the students chose Facebook as the best platform for sharing knowledge and information between students and the department, 16% chose Twitter, 13% Google+ and 1% others. However, an internet website was the preferred method for sharing knowledge and information such as, exam times, lecture cancelation and events.

This study is original, not only for being one of the first in Saudi Arabia, but for being one of the few to explore the use of Web 2.0 technology for sharing knowledge between an academic department and its students.

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