EXPLORING THE USE OF MICRO NOTE-TAKING WITH SOCIAL INTERACTION FEATURES FOR EDUCATION

Maram S. Al-Zaidi[1], Mike Joy[2], Jane Sinclair[3]

[1]*The University of Warwick (United Kingdom)*
[2]*The University of Warwick (United Kingdom)*
[3]*The University of Warwick (United Kingdom)*
E-mails [M.S.alzaidi, M.S.Joy, J.E.Sinclair @warwick.ac.uk]

Abstract

Despite the current high penetration of mobile devices and their rapidly increasing role in social life, little research has been conducted on exploring the use of mobile devices and social interaction features of Web 2.0 technologies for note-taking, but more specifically micro note-taking for education. This study sets out to investigate the perspectives of students regarding the possibility of integrating the features of social network sites into a micro note-taking application. The work aims to facilitate note-taking activities for students on their mobile devices and to support note sharing at a class level. An exploratory survey was conducted at the University of Warwick, UK, predominantly involving students in the department of Computer Science and Warwick Business School. Findings indicate that social network sites are already being used to extend classroom activities such as sharing notes captured by students in lectures. The findings also show that most students have their classmates within their social networks' friend lists, with the highest rate of usage amongst students being on Facebook. Based on the data collected, the results suggest that applications with social interaction features could enhance students' current note-taking practices. The results also indicate that micro note-taking features can be regarded as added services on top of existing social networks, and can exploit the functionality of these networks to include features such as note sharing for educational purposes.

Keywords: Micro note-taking, Web 2.0, Social Network, Mobile device, Education

1 INTRODUCTION

Note-taking is one of the important techniques used in learning processes that has proven its positive impact on student achievement ([1], [2]). Indeed, several studies have shown that taking notes from the information presented during lectures contributes to increasing students' performance and test scores ([3], [4], [5], [6], [7]). In addition, researchers such as Di Vesta and Gray [8] found that taking notes acts as an effective strategy to acquire information in classes when listening to instructors. In line with this, instructors often encourage students to record the main points from information presented in class rather than depending on their memories [9]. Kiewra [1] states that the purpose of note-taking in lectures is to capture concisely the main points covered. Other investigators have noted further benefits, highlighting that one of the key objectives of note-taking in class is to encourage direct attention ([10], [11], [12]). Kiewra [1] also argues that note-taking increases the care and attention with which the note-taker records information during or after a lecture compared to those who do not take notes.

Web 2.0 technologies, including social networking sites, have shown their high popularity in a context where most users are demographically at a younger age, or are college students [13]. However, a survey of college faculty [14] showed that although using Web 2.0 in teaching and learning is beneficial, very few staff used any type of Web 2.0 tools in the classroom. Recent research [15] has shed the light on the potential learning benefits of using Web 2.0 effectively in teaching and learning, especially through interactive content creation and knowledge dissemination.

Despite the current popularity of mobile devices, not much attention has been given to investigating note-taking using Web 2.0 technologies and mobile devices. Therefore, the aim of this study is to explore student attitudes towards the possibility of integrating the features of social network sites into micro note-taking applications to facilitate note-taking activities for students on their mobile devices. In this study, students' attitudes have been investigated from different angles, for instance, how students currently take notes and how students use their social network sites for educational purposes.

For the purpose of this research, micro note-taking can be defined as recording short remarks that serve as an initial reservoir of present information for its future uses through mobile devices. Micronotes focus on both the present and future use for information, and are used as a temporary storage as well as prospective memory aid [16].

The rest of this paper is organized as follows. Section 2 sets out the background of this paper. Section 3 reports the findings and discusses the results obtained. The contributions and limitations of this study, together with directions for future research are presented in Section 4.

2 BACKGROUND

Note-taking plays an essential role in learning and requires comprehension as well as a production process [2]. Notes are taken by students, for example, while listening to a lecture or reading a text ([3], [4]) or while attending a presentation in class [1].Although the focus of this paper is on note-taking in lectures, many other uses of note-taking are documented in the literature, including purchase lists, future event planning, activity planning, studying before the exam time, preparing for a technical talk, designing a model in an industry, and recording minutes of work meetings [2]. The primary objective of note-taking in lectures is generally seen as being that of keeping a record of the information presented [17]. However, scholars are generally united in perceiving two main functions of note taking as (i) encoding and (ii) external storage [8]. Encoding is a function that allows students to record information presented in class to facilitate learning, while external storage allows students to review the written notes to improve their performance. The goal of student note-taking is not just in taking them, but also in having them for reviewing later [5]. Notes recorded by students in

their own words have been found to be useful for reviewing content and to aid in improving their examination grades [3].

The advancement of Internet technologies through high speed 3G and 4G telecommunications and Wi-Fi hotspots has transformed the way university students use their mobile devices [18]. New generations of smartphones support fast Internet connections through 3G and 4G wireless technology in addition to faster Wi-Fi connections. Moreover, with new iPhone and Android phones providing millions of applications there has been a dramatic increase in the interest level in using these devices for education [19]. Indeed, in the last decade, and due to these advancements, researchers have shown an increased interest in using new technologies and computing devices in note-taking (e.g. [20], [21]).

Given their high resolution screens, high processing power and large internal storage and memory capacities, smartphones are now able to display full webpages. These capabilities have enhanced the usage of mobile devices in education [19]. Mobile phones have shown their use increasingly among students to facilitate communication and content sharing [22]. Mellow [23] has argued that incorporating mobile devices within educational context for students particularly fit the new generations' lifestyle, and Kim et al. [24] have suggested that electronic computing devices such as laptops and cellular phones will be required in future to take notes instead of using pen and paper.

Other technologies that can be utilised to facilitate communication and content sharing amongst students are those described as Web 2.0 technologies. Indeed, [25] argued that Web 2.0 is the future of education. Web 2.0 is a democratic, personal and DIY (Do-It-Yourself) medium of communication [26]. Recently, Web-based technologies, tools and services offered by Web 2.0 and social software or social media have increasingly attracted the new generation of students [27]. Users of Web 2.0 are able to share, add and create content rather than just finding static information on the Internet [28]. Therefore, [29] argues that Web 2.0 technologies increase connections, communication, collaboration, sharing information, content development and social interaction.

Social networking sites are currently widely used in higher education [30]. Social networks open up new opportunities in education for both basic functional usage and academic specific usage [31]. There are a number of social technologies and services that have been used to transform teaching and learning in higher education [32]. According to Falahaha [30], 60 percent of students use social network sites to support educational activities such as information dissemination and communication. Further research [33] has found that social networking is used in an educational context for tasks such as content generation, sharing, interacting and collaborative socialising. Social networking is also used in higher education in various fields such as marketing media, information media, communication media, feedback, announcement, sharing, task assignment and examination [30]. Further opportunities for using social networks in education have been investigated, including library uses, faculty uses and administration uses [34].

3. METHODOLOGY

Despite the increasing use of social media within education, little work has so far been carried out on ways in which notes can be taken and shared effectively by a group of students. Indeed, there is currently little information on the ways in which students are using available technologies and applications for note taking, to what extent notes are currently shared, and what means are used to support the sharing that occurs. In order to obtain insight into these questions a survey was conducted amongst university students, investigating their current note-taking practices, the applications, devices and social media sites they use, and their attitudes towards sharing and collating notes taken by group members. The results of this survey are required to inform ongoing work on the feasibility of micro note taking.

An exploratory survey was carried out at the University of Warwick, UK, targeting undergraduate students in both the Computer Science department (CS) and Warwick Business School (WBS). The CS and WBS were chosen because the access to the respondents were easy.Data were collected using a structured questionnaire. The

questionnaire was administered to a total number of 111 students, but after excluding all non-usable replies, a total of 105 surveys were used in the analysis. The demographic characteristics of the participants show that out of the 105 respondents, 77 were male (73.3%) and 28 were female (26.7%). and all of the respondents were between 18 and 25 years old.

3.1. DATA ANALYSIS AND RESULTS

As illustrated in Fig. 1, 95% of WBS respondents reported that they take notes during lectures either frequently or occasionally, compared to 93% of CS respondents. These results strongly indicate that note-taking is a highly important practice for students regardless of their specialism.

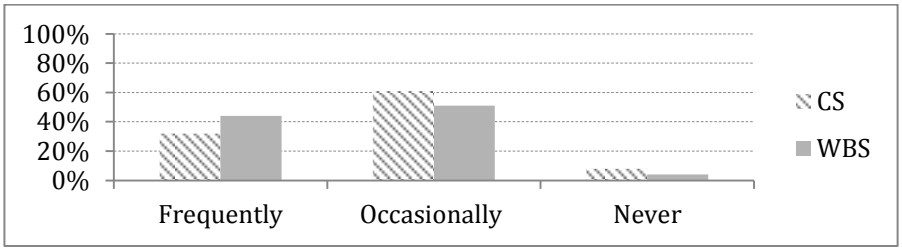

Figure 1: Frequency of note-taking by students

Figure 2 shows students' responses concerning the means by which they take notes in lectures. Students were asked to tick one or more options relating to the methods they use. Nearly 97% of CS students and 95% of WBS students take hand-written notes. The traditional pen and paper method is thus observed to still be the most widely-used means of note-taking across both groups of students. Although students commonly take laptops and tablets into lectures, the responses show that most students do not use them for taking notes. Interestingly, WBS students are more than twice as likely than CS students (47% compared to 18%) to record notes as word-processed documents on one of these devices. Audio recordings are made by fewer students, with roughly 12% from each department using this method. University policy requires students to seek permission for direct recordings and, while it is clear that not all students seek such permission, the requirement may act as a deterrent to some. Although a number of applications such as Evernote and OneNote are now available to support writing and organizing notes, relatively few students used these in practice. The reasons for this are explored further below (as shown in Fig 10). In this case, more CS students (13%) than WBS students (7%) use dedicated note-taking applications.

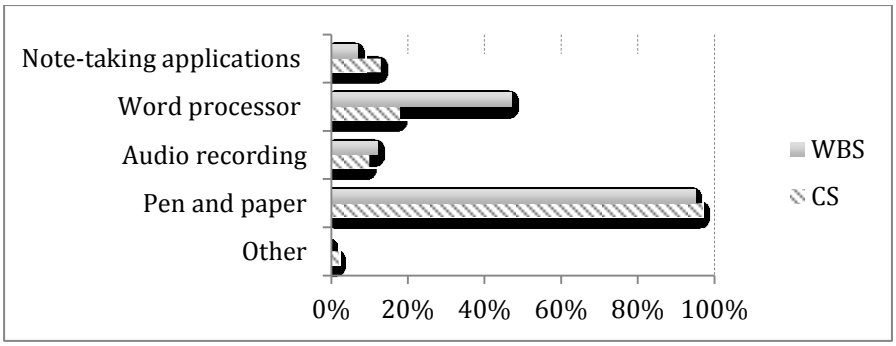

Figure 2: Note-taking strategies used by students

The data in Fig. 3 show that there are a number of reasons of why students take notes. According to the respondents, capturing the important points, embraced by 86% of WBS respondents and 67% of CS respondents, as the most frequent reason for note-taking. The second most important reason for note-taking, according to 63% of WBS students and 46% of CS students, is to review course content at examination time.

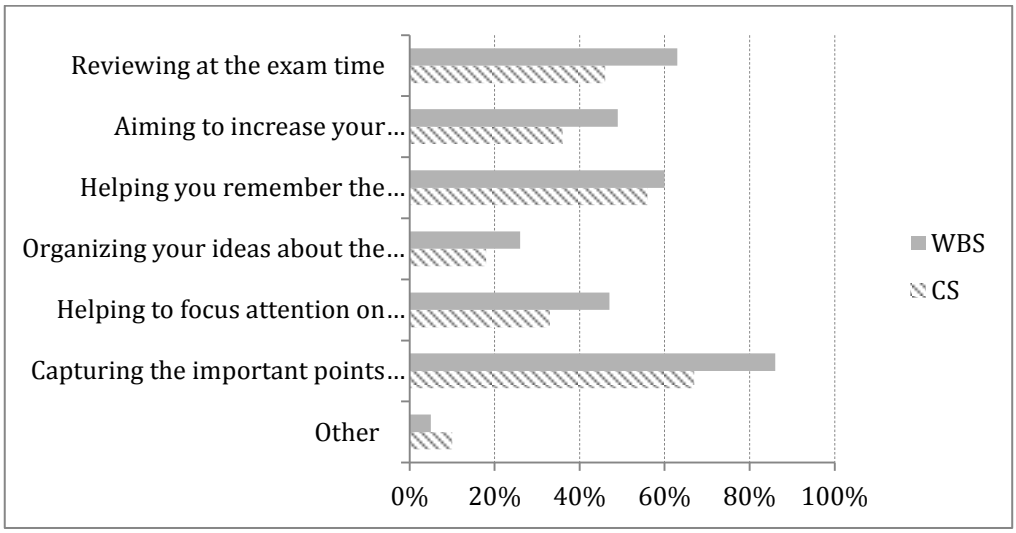

Figure 3: Reasons for taking notes by students

Fig. 4 shows the factors that motivate students to take notes. A teacher repeating a point or stresses its importance was indicated as the main motivation to take notes for 81% of WBS respondents and 67% of CS respondents. Writing materials on the board by the teacher was the second motivation to take notes according to 67% of WBS respondents and 56% of CS respondents. These results suggest that respondents are highly influenced by the teacher's actions, making them decide, at a given point, whether a note should be taken or not.

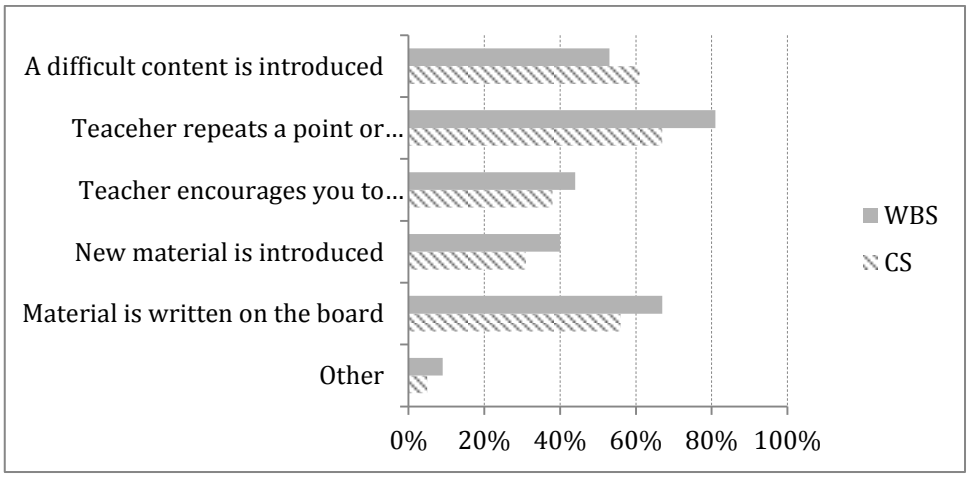

Figure 4: Factors motivating students to take notes

The results show that around half of the respondents ask their friends for their notes, which highlights the importance of note-taking amongst students in general. As illustrated in Fig. 5, the incompleteness of notes that are taken during lectures was indicated as the main reason for asking friends for their notes (CS respondents = 31% and WBS respondents = 48%). This was followed by checking for note accuracy as the second most important reason (CS respondents = 38% and WBS respondents = 35%). Another reason that was indicated, in 'Other', was copying the notes of a missing lecture (WBS respondents = 45% and CS respondents= 30%).

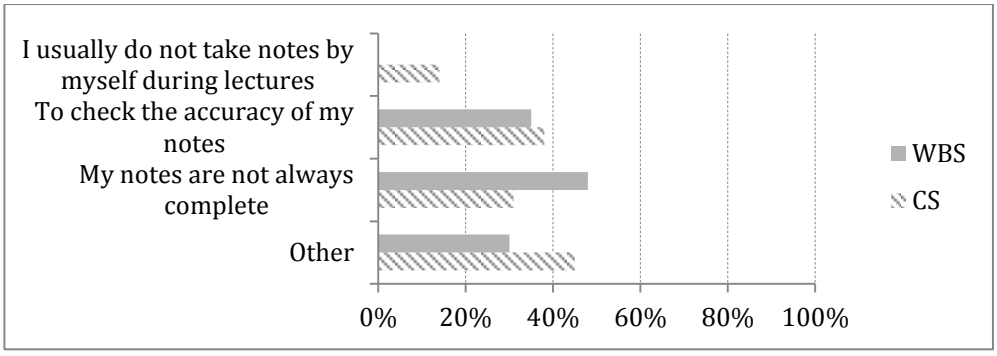

Figure 5: Students' reasons for asking friends for their notes

As shown in Fig. 6, lending the original copy was identified as the most common method used to share notes by students (CS respondents= 84%, WBS respondents = 74%). Interestingly, social networks were identified as the second most common method for sharing notes (CS respondents = 13%, WBS respondents = 43%).

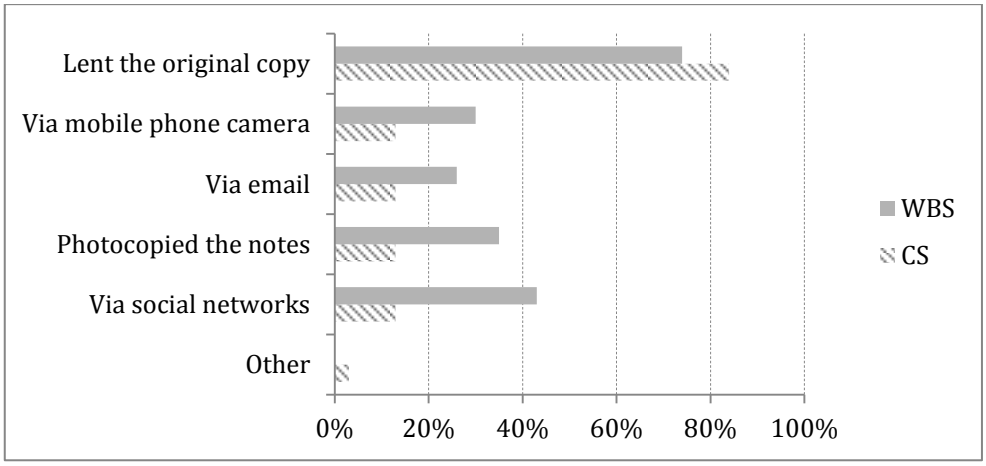

Figure 6: Methods for sharing notes between students

The vast majority of the respondents have their classmates within their social network friends lists (WBS respondents = 100%, CS respondents = 95%).Facebook was identified as the most common social network respondents used (CS respondent = 97%, WBS respondents = 100%), followed by YouTube (CS respondents = 62%, WBS respondents = 69%), as illustrated in Fig.7. The results clearly show that the majority of students are using social networks. This fact indicates that an application with social interaction features would be a valuable application to develop and test in an educational environment. In addition, it seems clear from the results that the design and services offered by Facebook are preferred over any other social network site by students, an indication that can be considered seriously when developing micro note-taking applications in the future.

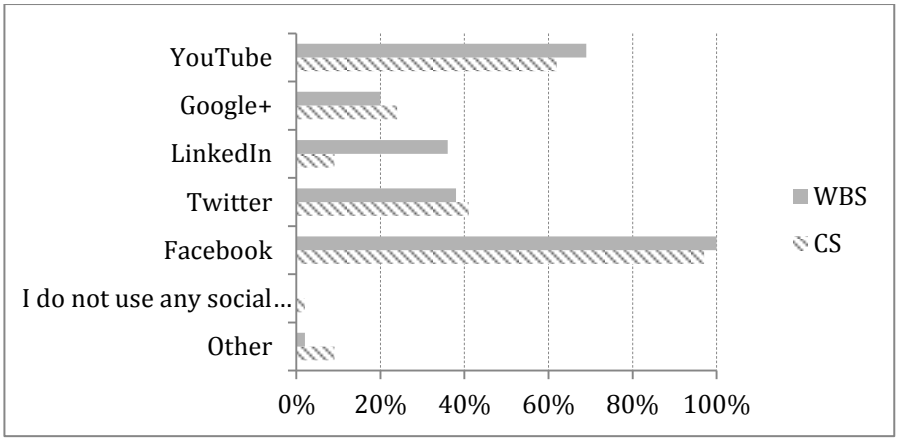

Figure 7: Most popular social networks amongst students

As Fig. 8 shows, using direct messages via social networking sites was indicated as the most common method for sharing notes used by the respondents (CS respondents = 100%, WBS respondents = 90%), followed by posting notes on the Wall of the social network (CS respondents = 50%, WBS respondents = 20%). The high use of direct messaging by students as the preferred method for note sharing can be regarded as a strong indication that direct messaging and other forms of text messages, such as short message service (SMS), can be utilised as feasible mechanisms when developing micro note-taking applications.

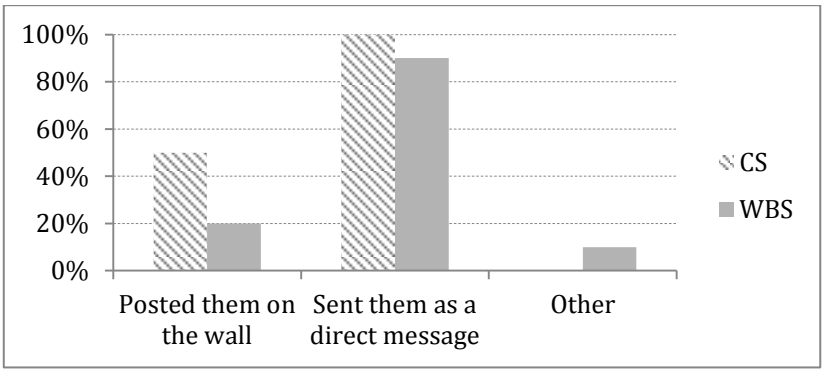

Figure 8: Methods for sharing notes between students in social networks

The majority of participants in this study demonstrated a keen interest in regard to the opportunity of sharing notes with their classmates (around 80% of CS respondents and 65% of WBS respondents), as shown in Fig. 9.

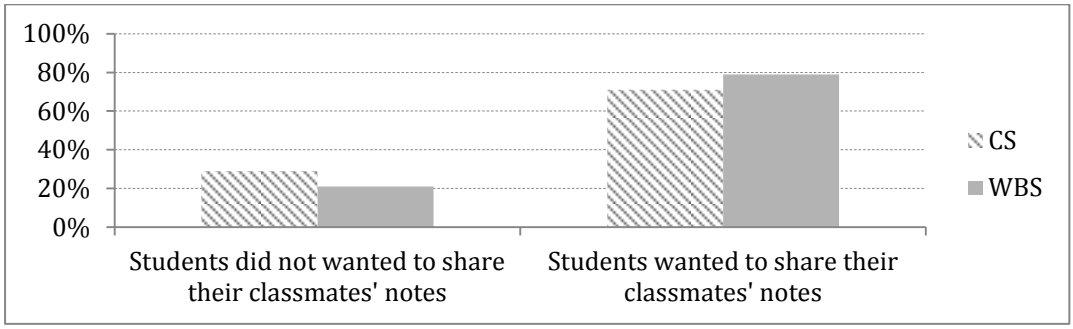

Figure 9: Note-taking applications and sharing notes with classmates

Fig. 10 illustrates the main reasons and limitations why students do not use current note-taking applications. The highest percentage of respondents stated that either there is no true motivation for them to use these applications or they simply did not know that such

applications exist. But, interestingly enough, several respondents reported that they do not use the current note-taking applications because these applications cannot offer true social interaction with their friends, or that these applications are not convenient enough to be used for accessing and sharing notes with their colleagues online.

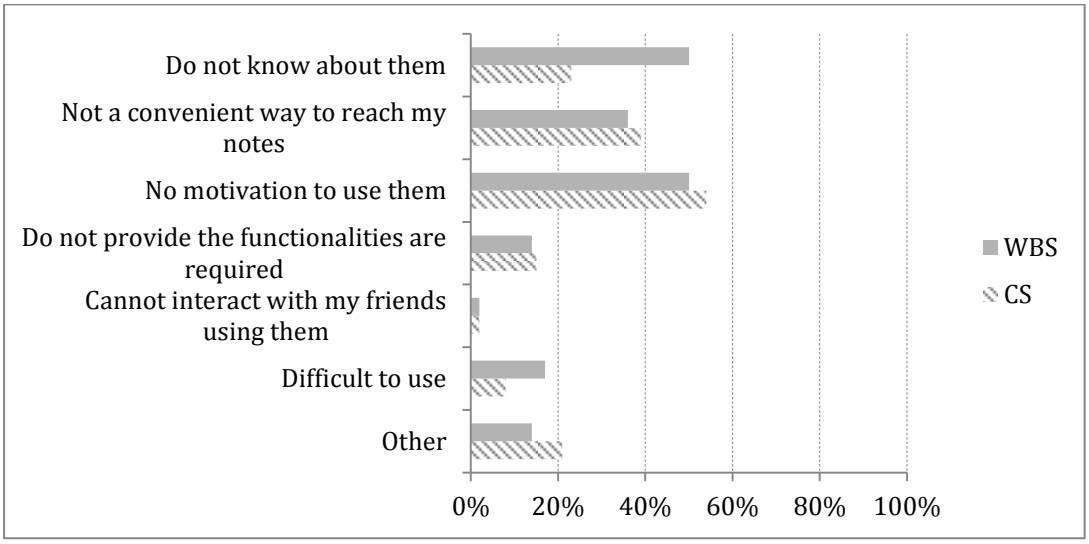

Figure 10: Limitation of current note-taking applications

4. CONCLUSION

This study explores the perspectives of students regarding the possibility of having social interaction features in micro note-taking applications to facilitate note-taking activities. The current note-taking applications as perceived by the respondents in this study do not provide sufficient motivation for students to use these applications. This is partially due to the fact that the applications do not offer a true social interaction experience between students. The findings indicate that social network sites are already used by students for note sharing, with most students having their classmates on their friend list, especially on Facebook. These results clearly suggest that a micro note-taking application with social interaction features would be an application that can be considered for development for education. This study is part of on-going research that will include the development and testing of a micro note-taking application with social interaction features, designed specifically for students.

REFERENCES

[1] Kiewra, K.(1987). Notetaking and review: the research and its implications. Journal of Instructional Science (16), pp. 233-249.
[2] Piolat, A., Olive, T., Kellogg, R. (2005). Cognitive Effort during Note Taking. Applied Cognitive Psychology (19), pp. 291–312.
[3] Hartley, J., Davies, I. (1978). Note-taking : A Critical Review. Innovations in Education & Training International (15), pp.207-224.
[4] King, A. (1992). Comparison of self-questioning, summarizing, and note-taking review as strategies for learning from lectures. American Educational Research Journal (29), pp. 303-323.
[5] Carter, J.,Matre, N. (1975). Note Taking Versus Note Having. Journal of educational Psychology (67), 900-904.
[6] Jensen, M., Lowell, K. (2011). Notetaking and Recall of Auditory and Visual Information : A Pilot Study. Intuition. (7), pp. 14-20.
[7] Plaue, C., LaMarca, S., Funk, S. (2012). Group Note-Taking in a Large Lecture Class : Design, Implementation, and Evaluation of a Low-Cost Universal Design Practice. SIGCSE'12, pp. 227-232.

[8] Di Vesta, F.,Gray, G. (1972). Listening and note taking. Journal of educational psychology (63), pp.8-14.
[9] Bonner, J., Holliday, W. (2006). How college science students engage in note-taking strategies. Journal of Research in Science Teaching (43), pp.786–818.
[10] Hartley, J., Marshall, S.(1974). One notes and notetaking, Universities Quarterly (28), pp. 225-235.
[11] MacManaway, L. (1968).Using lecture scripts. Universities Quarterly (22), pp. 327-336.
[12] Meter, P., Yokoi, L., Pressley, M. (1994). College students' theory of note-taking derived from their perceptions of note-taking. Journal of Educational Psychology (86), pp. 323-338.
[13] Kaplan, A., Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media, Business Horizons (53), pp. 59-68.
[14] Ajjan, A., Hartshorne, R. (2008). Investigating Faculty Decisions to Adopt Web 2.0 Technologies: Theory and Empirical Tests. Internet and Higher Education, (11), pp.71-80.
[15] Bennett, S., Bishop, A.,Dalgaron, B., Waycott, J.,Kennedy, G., (2012). Implementing Web 2.0 technologies in higher education: A collective case study, Computer & Education (59), pp. 524-534.
[16] Lin, M.,Lutters, W.,Kim,T.(2004).Understanding the Micronote Lifecycle: Improving Mobile Support for Informal Note Taking , CHI (6), pp.687-694.
[17] Suritsky, K., Hughes, C. (1991). Benefits of notetaking : implications for secondary and postsecondary students with learning disabilities. Learning Disability Quarterly (14), pp.7-18.
[18] Green, K., (2000). Technology and instruction: compelling, competing, and complementary visions for the instructional role of technology in higher education, The changing American University: The Future of the City of Intellect, pp. 1-12. Available from: http://www.campuscomputing.net
[19] Godwin-Jones, R. (2011). Emerging Technologies Mobile Apps for Language Learning. Language Learning & Technology (15), pp. 2-11.
[20] Kam, M. et al. (2005) Livenotes: A System for Cooperative and Augmented Note-taking in Lectures. ACM Conference on Human factors in computing systems, pp. 531-540.
[21] Reilly, M.,Shen, H. (2012). Shared note-taking: A Smartphone-based approach to increased student engagement in lectures. The 11th International Workshop on Collaborative Editing Systems in Conjunction with ACM Conference on Computer Supported Cooperative Work.
[22] Anderson, P., Blackwood, A. (2004). Mobile and PDA technologies and their future use in education. JISC Technology and Standards Watch (4), pp. 1-33.
[23] Mellow, P. (2005). The media generation: Maximise learning by getting mobile. Proc. ASCILITE 2004. Available from: http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/53_Mellow.pdf
[24] Kim, K., Turner, S., Pérez-Quiñones, M. (2009). Requirements for electronic note taking systems: A field study of note taking in university classrooms. Education and Information Technologies (14), pp. 255- 283.
[25] Hargadon, S. (2008). Web 2.0 is the Future of Education. Available online from http://www.stevehargadon.com/2008/03/web-20-is-future-of-education.html
[26] Berners-lee, T.(2001). Weaving the web: Origins and Future of the World Wide Web. Mason, OHIO: Texere Publishing.
[27] Bryant, L. (2007). Emerging trends in social software for education, Emerging Technologies for Learning (2), pp.9-187.
[28] Thompson, J. (2007). Is education 1.0 ready for web 2.0 students? Innovate: Journal of Online Education (3).Available from: http://soe.wiki.trevecca.edu/file/view/Is_Education_1.0_Ready_for_Web_2.0_Students.pdf
[29] Drachsler, H., Hummel, H., Koper, R. (2007). Personal recommender systems for learners in lifelong learning: requirements, techniques and model, Int. J. Learning Technology, pp. 1-20.
[30] Falahaha, Rosmala, D. (2012). Study of Social Networking Usage in Higher Education Environment. Social and Behavioral Sciences (67), pp. 156-166.
[31] Body, D., Ellison, N. (2008).Social Network Sites: Definition, History, and Scholarship. Journal of Computer-Mediated Communication (13), 210-230.
[32] Alexandra, B., Levine, A., (2008). Web 2.0 Storytelling: Emergence of a New Genre. In EduCAUSE Review (43).

[33] Hamid, S., Chang, S., Kurnia, S.(2009) .identifying the use of online social networking in higher education. pp.419-422. Proceedings ASCILITE Auckland 2009. Available online from http://www.ascilite.org.au/conferences/auckland09/procs/hamid-poster.pdf
[34] Roblyer, M., McDaniel, M., Webb, M., Herman, J., Witty, J. (2010). Finding on Facebook uses and perceptions of social networking sites. Internet and Higher Education (13), pp. 134-140.