A Survey of College Students' Paperless and Paper-Based Learning

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Abstract: Most educators consider note-taking to be an important part of formal classroom learning. Advances in technology such as tablets, mobile apps, and recorded lectures are changing the dynamics of the classroom and impacting the way students write and review class notes. These tools may improve students' ability to take notes, but they may also hinder learning. In an era of dynamic technological developments, educators must regularly examine and evaluate the impact on formal and informal learning environments. This paper discusses key background literature on student learning styles, identifies recent trends and potential impacts of mobile technology in classroom note-taking and student learning, predicts the future direction of note-taking in the context of digital lifelong learning, and contrasts it with traditional paper-based learning to help college students find the best fit for their learning mode in the biochemistry of learning.

Keywords: Paperless; Paper-based; Note-taking; Education

1. Introduction

Note-taking is described as a universal practice or a staple activity carried out by students during lecture instruction in higher education. Many researchers agree that the importance of this student practice lies in the positive impact it has on recording and remembering class content; on increasing retention of information; and, ultimately, on student learning.

However, more recent research has focused on paperless note-taking practices since there has been a shift in college classrooms and many university students nowadays make use of electronic devices, such as laptops, to take lecture notes. Paperless note-taking has been studied in relation to enhancing student performance, promoting knowledge transfer, and multitasking, among other topics, all showing interesting results. A few studies have also covered the differences in effectiveness between electronic and non-electronic note-taking. (Altwaijry et al. , 2021; Peñarrubia-Lozano et al. , 2021)

2. Literature Review

However, diverse factors can influence the way students take notes and thus affect their learning effectiveness. These include the student's knowledge and acceptance of paperless learning products, the use of paperless learning products by those around them, their current learning patterns, the average amount of time spent on paperless learning per day, and the level of concentration in doing paperless learning. Note-taking is an individualized task, and the interpretation of words becomes more complex when individual differences in note-taking ability are taken into account. In addition to these historical research variables, new factors are emerging that can affect student note-taking. The introduction of tablets, note-taking apps, and other educational technologies in the classroom is changing the way students take notes, consume, and process information in the classroom.

Traditionally, research on note-taking has explored two major aspects of this phenomenon: paper note-taking and paperless note-taking. The pandemic of paperless learning continues in higher education. During this transition from a single paper-based learning to multiple learning modes available, students are recognizing the importance of effective use of electronic devices for learning.

Effective study notes require good planning and clear goals for students. In addition, university students continue to develop

practices regarding how to balance paperless and paper-based learning. Particularly during the epidemic, more and more higher education institutions have embarked on a digital transformation and their learning materials are being distributed to students in a paperless format. The question of how students can effectively use such paperless resources is becoming increasingly important.

This process also includes adequate strategic preparation, building trust, thinking in processes, consolidating and strengthening the collaborative and organizational knowledge of all parties involved individually. The findings in the literature suggest that students are less receptive to the notion that paperless learning is more efficient, and they do not believe that paper-based learning can be replaced by paperless learning, preferring a combination of both modes of learning.

As mentioned above, paperless learning brings opportunities and difficulties to the field of higher education. Whichever learning model is used for learning is an individualized task that we should adopt wisely based on our experience and our own nature. It is particularly important to focus on the perspectives of practicing students; as they are the group most affected by this process. It is also crucial to obtain a detailed examination from different perspectives by obtaining a large sample. Hence, taking into account the strong points, but also the limitations of the studies reviewed above and others within the note-taking research literature, we need to point out that in our study,

(1) Note-taking is viewed as an aid for learning, rather than in the light of its effects on test achievement.

(2) We focus on students' note-taking experiences, instead of on goals, reasons or factors affecting their note-taking.

(3) As peers, we explored the phenomenon of paper-based and paperless note taking in more depth.

(4) Whether there were significant differences in students' adoption of paperless learning by gender, subject, and grade level.

By recording students' note-taking experiences and descriptively analyzing the collected data, this study aimed to gain insight into the perceptions of college students at four Chinese universities regarding paperless and paper-based learning.

3. Methodology

3.1 Method

The purpose of this study is to explore the experiences and changes in the perceptions, methods, and directions of today's college students' paperless and paper-based learning in the Chinese higher education system, so as to suggest guidelines for improving the note-taking system of college students. Therefore, a descriptive qualitative research method was adopted. The data collected from the questionnaire will help researchers to analyze the experiences of participants of different genders, grades, and majors. This questionnaire was distributed in May 2022. The deadline for responding to the online questionnaire was 7 days from the date of submission. Within the scope of the study, data were collected from higher education students at four Chinese universities through an online questionnaire after obtaining the necessary permissions. Students were provided with detailed information about the study and it was emphasized that their personal information would be thoroughly protected by adding the participant consent form at the beginning of the questionnaire.

3.2 Findings

Table 1 Results of the variance analysis of each dimension on major

variable	Option	N	Mean	Std. Deviation	F	Sig.	Multiple Comparison
People around use paperless learning products	Literature and history	26	2. 27	1. 041	3. 723	0. 006	Economic management>Literature and history
	Economic management	64	2. 89	1. 01			
	Science and Engineering	39	2. 31	0. 893			Economic management>Science and Engineering
	Medicine	15	2. 2	1. 014			Economic management>Medicine
	Arts	14	2. 21	1. 188			Economic management>Arts

Based on the results of the above one-way ANOVA, it can be seen that among the above dimensions, only the option "People around use paperless learning products" differs in terms of students' major, as its significance test results show a 0. 01 The use of paperless learning products by those around" has a more significant difference in the mean scores of different majors, according to the results of multiple comparisons. The results of the comparison are: Economic management>Literature and history, Economic management>Science and Engineering, Economic management>Medicine, Economic management>Arts.

4. Discussions

The results of the study showed that the "use of paperless learning products by people around" option differed significantly by students' major category. In contrast, students majoring in economics and management are more likely to be surrounded by people who use paperless learning products. Based on the fact that "Economics and Management majors > Literature and History majors, Economics and Management majors > Science and Engineering majors, Economics and Management majors

> Medicine majors, Economics and Management majors > Art majors", and considering the fact that the degree of students' knowledge of paperless learning products is highly consistent across majors, we found that there is a high degree of consistency among students' majors.

There is also a high degree of consistency, which may indicate that most economics and management students may have sufficient funds to support paperless learning facilities, and that funding issues are one of the factors that prevent students in other majors from pursuing paperless learning. In terms of the nature of the discipline, a digital format that allows for typing and graphing may be advantageous given the complex, graph-driven course content in economic management courses. In addition, the world economy is evolving rapidly, economic markets are changing rapidly, and the study of economic management needs to respond to changes in the economic environment. As a result, most economic management students need electronic devices to help them access the most up-to-date information. Other majors may be relatively stable in terms of subject knowledge, and therefore students in other majors have a less strong need for up-to-date information. (Aristovnik et al. , 2020; Sercemeli & Kurnaz, 2020; Turan & Gurol, 2020)

Finally, as the digital environment has an increasing impact on college students, we can extend the impact it brings to how educators respond to this change in the notes of college students. the first decades of the digital age has introduced society to a variety of paradigm shifts including how we view the concepts of information storage and retrieval. College students may need to rethink what it means to take notes, what the ultimate purpose of college students taking notes is, and how those notes will carry over into their future careers.

5. Conclusion

Therefore, in this study, a comprehensive assessment of paperless and paper-based learning processes was conducted from the students' perspective. Within the scope of the study, collecting data from a large sample group of students from different schools, subjects and grades was the focus of the study and increased the generalizability of the results. However, the fact that the survey population was skewed towards female students is a limitation of the study. The results of students undertaking paperless learning were also limited to national contexts as practices differed from country to country and even from university to university.

In this context, it is very important for students to grasp the balance in paperless learning, to use paperless learning devices effectively, and to eliminate the influence of entertainment applications on learning. In reality, it may be beneficial for students to combine paperless learning styles with paper-based learning styles in order to effectively use the advantages of paperless over paper-based learning materials. Nonetheless, it may be recommended that faculty include activities that support students in taking paperless notes such as sharing the Power Point for class to ensure that students are more effective in their paperless learning.

This is the new normal in higher education and by integrating the advantages of paperless and paper-based learning with a hybrid approach will enable an efficient learning process. By creating a blended learning environment in the future of learning, student performance and learning patterns can also be examined. Factors affecting student performance can be studied in depth from different perspectives based on sociological, psychological and domain-specific characteristics.

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