ISSN 2616-7433 Vol. 3, Issue 7: 77-83, DOI: 10.25236/FSST.2021.030714

Chinese University Students' Note-taking in the Educational Technology Classroom

Qunli Mo

Ningbo University of Technology, Ningbo, Zhejiang, 315211, China

Abstract: *The study's objective is to identify issues that teachers should consider when giving note-taking guidance to Chinese university students in today's information technology environment. The main data source is a questionnaire survey of university students' note-taking behavior; data are also obtained from the university's annual note-taking competition. Our analysis of the data shows that students perceive the primary purpose of their note-taking to be to cope with exams, and they do not seem to recognize that it can also cultivate their independent thinking and learning abilities. Furthermore, while the students in our sample demonstrated significant inclusiveness regarding whether and how to take notes, they were found to lack note-taking strategies. Accordingly, our study concludes with recommendations for teachers to emphasize the importance of note-taking, introduce alternative approaches to note-taking, and enhance students' note-taking abilities.*

Keywords: *Information technology; Note-taking in class; Questionnaire survey; Learning ability; Note-taking strategies*

1. Introduction

Note-taking has a long history in educational settings and has been shown to lead to improve learning and performance outcomes, with numerous prior studies finding that university students' note-taking has a significant predictive effect or significant impact on their academic performance (e.g., Song, Liu, and Fu 2017). Recent research on note-taking strategies has extended to the field of digital note-taking; for instance, Bui, Myerson, and Hale (2013) investigated the use of microblog notes and computer notes, and Sujatha, Vijayalakshmi, Prabhakar, and Krishnamoorthy (2020) introduced "ENotes," a note-taking tool for online learners. Relatedly, in China, it has been observed that university students are using their cell phones to photograph PowerPoint presentations (PPTs) instead of writing notes by hand (Zhang 2014). Analyzing such note-taking strategies in the context of today's predominantly multimedia environment, Hou (2017) proposed countermeasures, such as developing the informationized teaching levels of university lecturers, reducing the dependence on PPTs, diversifying college classroom teaching modes (i.e., mixed-teaching modes, as well as ordinary multimedia PPT teaching), and establishing digital note-taking practices to improve students' independent learning ability.

2. Research background

To date, little consideration has been given to how university students are taking notes in this new era, or how teachers might help students adapt to the new teaching reforms by integrating traditional strategies with the highly popularized modern educational-technology environment. In the present paper, we first describe a questionnaire survey that we developed to investigate university students' note-taking in class. We then analyze the conditions in which the students are taking notes (i.e., in the context of the government's Internet Plus initiatives), and combine these data with results from the university's note-taking competition, in order to formulate recommendations, based on our findings, for teachers providing guidance to students on how to take notes in this new era of educational technology, systems, and reforms.

ISSN 2616-7433 Vol. 3, Issue 7: 77-83, DOI: 10.25236/FSST.2021.030714

3. Methodology

3.1 Research design

Our study utilized a questionnaire survey approach. The questionnaire was designed through discussion with teachers and student representatives and with reference to previously prepared questionnaires about class notes (Liu, 2019). The main content (in Chinese) of the study's questionnaire covered students' attitudes toward taking notes in class, their reasons for taking or not taking notes, the content of their notes, their methods of taking them, any problems encountered with note-taking, and the sort of guidance on note-taking that they needed or support they hoped to receive.

The survey was conducted from May to July 2021. Prior to the formal large-scale administration of the questionnaire, a 20-minute pilot study designed to test the reliability of the final questionnaire was carried out in a class comprising 61 second-year students who were majoring in International Business. The requirements and object characteristics of the survey sample were the same as those of the survey population. During the survey period, most of the issues of the sample objects reflected the overall problems of the survey objects. Accordingly, the accuracy and authenticity of the respondents could be considered to be valid to a large extent. On this basis, we collected the survey results, and carefully analyzed and summarized them.

Following the reliability testing, and corresponding revisions being made to the wording in the questionnaire, the question concerning what kind of help students hoped to get was changed into an open-ended question. Thus, the final version of the questionnaire featured 10 multiple-choice questions and two open questions that allowed students to write down any additional problems or other ideas concerning note-taking. Next, the formal administration of the questionnaire was carried out.

3.2 Participants

The study's survey respondents were undergraduate students studying at ordinary Chinese universities. The final sample comprised 506 students (158 males, 348 females) from all over China. Most of them were sophomores, and their majors included science, literature, economics, management, and engineering, among other subjects.

The students provided self-reports in response to questions regarding academic achievement, rather than, for example, data pertaining to their latest exam or other academic results, as Chinese students know their own grades and academic status well, and a recent result may not fully represent the average, true level of the student. More than half of the surveyed students defined themselves as being at an "average level" or "a little lower than average" academically, around a quarter identified themselves as being "among the top 10" in their class, while those defining themselves as "underachievers" accounted for a fifth. This sample is highly representative of Chinese university students overall. Accordingly, our study's results and the corresponding recommendations for teachers will be generalizable to different higher education institutions in China, as well as applying internationally in countries with a similar culture to that of China.

3.3 Data collection

The questionnaires were distributed on the website www.sojump.com, an online survey platform, by a junior student in a university in Tianjin, China. They were then forwarded by teachers in a university in Zhejiang, China, and a university in Hebei, China. Consequently, the questionnaires were completed by students attending these three universities. All three universities are designated as "ordinary"-level undergraduate universities, and their faculty, teaching facilities, student achievement, and learning habits are all classified as being at the "medium" level in China.

The junior student and two teachers sent the potential participants a link to the questionnaire via the online messaging services WeChat and QQ. Students completing the questionnaire voluntarily received a monetary "red envelope reward" for participating in the study. All questionnaire submissions were anonymous, and a questionnaire was considered to have been submitted successfully only when all the questions were answered. Six hundred and fifty-eight university students were sent a link to the questionnaire, and, ultimately, 506 valid questionnaires were collected.

In addition, this paper's first author, who teaches at XXX University, used data from the university's annual note-taking competition to supplement the primary data analyzed.

ISSN 2616-7433 Vol. 3, Issue 7: 77-83, DOI: 10.25236/FSST.2021.030714

4. Results

4.1 Attitudes about whether or not to take notes

77% of the students in our study believed that taking notes is good for learning. However, 11% indicated that it did not matter whether they took notes or not, and 10% considered themselves too lazy to take notes, even though they know that notes should be taken. Only four students considered note-taking to be unnecessary or a waste of time. Furthermore, when they supplemented their single-choice answer to this question through responses to the open question, some students described how the teachers usually explained the knowledge points so quickly that they could not even follow them through listening, let alone attempt to take notes at the same time.

However, the vast majority of participants agreed that taking notes in class was beneficial to learning, suggesting that students do generally realize the importance of class notes—a consideration that has not changed with the development of technology. This finding should also prove useful with respect to future students and classes: when teachers perceive that students are failing to take notes, and that they need to be persuaded to do so, recommendations can be more targeted and persuasive if teachers know that the students appreciate the importance of taking notes, but do not take them mostly for other reasons.

At the same time, in their responses to the open-ended question about their additional views on note-taking, some students commented that it should not be limited to being a formal procedure or convention, and the key was to do it mindfully. Others observed that university students should learn, instead of "just memorizing," which suggests that these respondents perceive taking notes to be another way of simply learning by rote. Some students posited that note-taking was one way to learn, but not the best way. There were also students who felt that it was good to have notes but acceptable not to take them. Overall, we infer from these results that a significant number of students favor flexibility in note-taking based on their own learning situation and habits, with no need for adherence to rigid rules.

Since 2013, the university where this paper's first author teaches has held six annual note-taking competitions. Each competition features only 200 or so participants, a small proportion of the circa 13,000 students who attend the university. Overall, from these data, it would be reasonable to extrapolate that, while an impressive 77% of students might agree that note-taking is necessary, the percentage who actually take notes in class will be much lower.

4.2 Reasons for taking or not taking notes in class

Around 35% of students thought that taking notes would enable them to get higher marks in the exam, as the notes allowed them to record what the teachers had said in class, which suggests that test scores are the main motivation for students to take notes. In addition, about a third of the students thought that note-taking would enable them to understand and learn better, while nearly 18% took notes out of habit.

Through their responses to the open question, many students emphasized that the main reason to take notes was for review before an exam. Other reasons given for taking notes referred to the complexity of university life and to limited memory and concentration capabilities, with the latter feedback corresponding to the old Chinese saying that a good memory is no better than bad note-taking. Some participants further observed that university students should take notes because it is difficult to consult teachers anytime and anywhere as they had been able to do in high school.

Within the self-reports of academic achievement, there were four categories of students: those in the "top ten" of their class, the "average" students, students with "a little lower than average" grades, and those with "underachievers" grades. Analysis of these four categories of academic status shows that the proportion of each choosing "it is my habit" to complete the statement "I take notes because…" was 20%, 18.6%, 16%, and 0% respectively. This finding supports the postulation that the habit of taking notes is positively correlated with academic performance.

On the other hand,only 52 students answered this question regarding reasons for not taking notes (with most of the others having answered the previous question "I take notes because…"). A quarter of these respondents indicated that they were too lazy to take notes in class; about a fifth thought that what the teacher presented was all in the textbooks, and so there was no need to take notes; another fifth felt that their teachers would mark the key points for the exam and tell them what to review at the end of the term; and a further fifth stated that the teacher would send a PPT at the end of the semester

ISSN 2616-7433 Vol. 3, Issue 7: 77-83, DOI: 10.25236/FSST.2021.030714

and that reviewing key points or a PPT before an exam would be sufficient for them.

Overall, our findings suggest that the majority of students' reasons for taking or not taking notes concerned exams. This is far removed from the wider cognitive attainment opportunities promulgated by experts and scholars who believe that taking notes can cultivate learners' independent thinking ability. According to our results, most students do not appear to realize the deeper effects of note-taking on learning, and, consequently, we would recommend that teachers pay more attention to teaching their students the objectives and greater significance of taking notes in class.

4.3 Contents and methods of students' note-taking

In this survey 64% of the students said that they chose to make a note of only the difficult and important points, while 16% conveyed that they seldom take notes unless the teacher reminds them to do so, indicating that quite a few students rarely take notes at all. Less than 10% of the students in this study confirmed that they noted down almost everything their teacher said.

Through their additional comments in response to the open question, some students reiterated that they just took notes in respect of the exam points, which is consistent with the earlier findings regarding the perceived purpose of notes and the reasons for taking or not taking them. Just over 5% of the surveyed students stated that they only wrote down the results, not the process. However, an American professor who teaches in China is skeptical of this result because, in her experience, most Chinese students make a note of only the results, not the process. This apparent inconsistency may be because Chinese students do not realize they are noting just the results, rather than the detailed output processes, and while, for example, an American professor might think that the output of a loaf of bread should start with how much flour to knead, then how much of the other ingredients to add, how hot the oven should be, and how many minutes it takes to bake, Chinese students likely often jump straight to the result: we make a loaf of bread.

Similarly, we analyzed the responses of those students whose grades were in the top 10, average, lower than average, and underachievers, and found that the response "I write down almost everything the teacher says" was given by 16%, 7.5%, 6%, and 0%, respectively, of students from these four categories. This finding is supported by the results of previous research that suggest that note-taking is positively correlated with achievement, even in today's highly informationized classrooms.

More than half of the students indicated that they took notes for the most important courses, and more than a third for the difficult courses. Only a fifth of students chose the "all courses" option, while another fifth chose "no specific course."

A key consideration here is which courses students define as "important." In the open question, some respondents emphasized that they took notes in the courses that were important to them, which lends a more open meaning to "important courses." It is also possible that everyone would have a different answer to this. More directly, some students just answered that they wrote down exam points, and we can infer from this that some students regard what is important in the exam to be all that is important for them.

Moreover, every university course has its own characteristics and standards. University students' values and outlooks on life are still at relatively formative stages; accordingly, their cognition will likely have some limitations. It is obviously wrong, though, for students to choose whether to take notes based solely on their judgment of whether a course is "important." How to guide students toward being able to recognize this and to make corresponding changes is another challenge for university teachers that we would highlight.

The result also shows that about 60% of students chose to write notes in the margins of their textbooks, while only 34% opted to write them in a special notebook, and just 4.35% made notes using their phones or computers. In the open question, students added to these responses, with some observing that recording notes on a phone and recording them on paper materials are totally different processes, and that notes recorded through the latter means would feel more practical and be easy to access. Other students concurred that it is a good habit to take notes, but that they can be taken on a phone or computer, not necessarily on paper. Only a small proportion of students favored taking notes on computers and cell phones, from which we infer that, while some students have started to take notes on their phones, computers, and other electronic devices, others are only planning to do so or simply agree that it is a good idea. Also, a number of students stressed that taking notes on paper was too messy and that they were unable to keep up with teacher using this approach, which made them

ISSN 2616-7433 Vol. 3, Issue 7: 77-83, DOI: 10.25236/FSST.2021.030714

become frustrated more easily; by contrast, if they used a tablet to take notes, they found it easier to record information, as they did not have to worry about typesetting, formatting, and so on. Such responses suggest that, with the development of increasingly light and portable electronic devices, more and more students will likely choose to use non-paper systems to take notes.

Regarding the examples of note-taking sourced through our university's competition, in addition to those written in the separate notebooks, some were written in the margins of the textbooks or on examination papers. Therefore, it appears that teachers do not mind where or in what form students take notes, but are more concerned about the substance of the notes taken and the levels of comprehension that these notes can demonstrate.

4.4 Problems encountered when taking notes

Through comments given in response to the open question about problems encountered in taking notes, several key issues were identified:

- Quite a few students did not know what to take down and where to start when they reached university, with university learning being perceived as being very different from high school learning.
- When teachers did not follow the textbook, or even the PPT, it made it difficult for students to take notes.
- Many students would prefer it if the teacher prompted them to take notes.

These additional insights suggest that university students are not as adept at using their initiative as teachers might believe them to be at this stage. In high school learning, students are dependent on teachers' comprehensive guidance, and therefore often find it difficult to adapt to a university's much freer, more independent learning style. In particular, these students lack strategies for taking notes during university classes.

Within the examples sourced through our university's note-taking competition, commonly used note-taking strategies included color coding, representative charts, and short outlines. However, there was an observable lack of problem awareness here too, which is consistent with the research results of Song et al. (2017). "Problem consciousness" in this context refers to a psychological state of doubt, confusion, anxiety, and inquiry that is generated when students encounter difficult and puzzling practical or theoretical problems in cognitive activities.

5. Discussion

Further to the above-summarized research findings and analysis, the following suggestions are proposed to promote the quality of university students' note-taking.

5.1 Help students understand the importance of taking notes

That the positive correlation between note-taking and achievement, consistent with the previous research results, has not changed with the development of science and technology. Meanwhile, most students generally regard notes as a tool with which to cope with exams, and they do not make full use of notes to help their studies overall. Of specific concern here is the finding that most students do not use note-taking to extend classroom knowledge and develop their independent thinking abilities.

In this information age, modern technology offers unprecedented convenience for students in terms of teaching resources, but also brings processes and information far beyond the traditional teaching environment and its requirements. Therefore, it is increasingly important to cultivate students' autonomous learning abilities. In particular, self-learning and the monitoring thereof are core higher-educational requirements. If their ability in respect of independent learning is improved, students will not only adapt more readily to learning in the wider context of modern society but also attain at least the same learning effect as they would through traditional handwritten notes. Furthermore, this is a mutually reinforcing relationship.

Students must be helped to appreciate that class note-taking is not only for examinations or for better knowledge learning, but that, more importantly, it will help them to develop their independent thinking and independent learning abilities, and thereby prepare them for lifelong learning. Our study's

ISSN 2616-7433 Vol. 3, Issue 7: 77-83, DOI: 10.25236/FSST.2021.030714

results suggest that more students would choose to take notes if their teachers did not highlight the exam points, or tell them what to review, or send them PPT slides at the end of a semester. Even if students just want to improve their grades, they can be encouraged to pay more attention to class notes, whereupon, perceiving the positive moderating effect of notes on achievements and learning benefits, they will be further motivated to appreciate the wider function and benefits of taking notes.

5.2 Introduce a variety of approaches to note-taking

The application of mobile intelligent terminal technology as the basis of teaching tools has been gradually emerging at Chinese universities. Examples include Clicker, Socrative, Google Classroom, Kahoot, "blue ink cloud class" lessons, Tsinghua Rain Classroom, and the MOOC classroom, all of which offer additional support tools for the university-classroom teaching model. Through these education technology options, the learning environment can become more appealing for students, interactions between teachers and students in the information technology environment will be enhanced, and students may also be able to take notes more conveniently and quickly.

Currently, research shows that the proportion of students taking electronic notes is not high. With future developments of the technology, though, note-taking is expected to be transformed considerably and quickly. Accordingly, we would recommend that notes, whether handwritten or digital, are referred to as "notes," and, in addition to accepting that knowledge and information stored in a cell phone or using computer software is simply a new type of digital notes, teachers should also take the initiative to understand and learn a variety of new note-taking modes, and then give their students targeted guidance regarding electronic note-taking, in order to improve the quality of students' notes overall. In this way, teachers can keep pace with the revolutionary influence of the information technology era on education and teaching, as well as continuing to stimulate students' interest and improve the quality of their learning outcomes.

5.3 Improve students' ability to take notes

This study's findings indicate that many university students do not know how to take notes, and even students who are considered to be good note-takers, such as those involved in the university's note-taking competition, only use a few simple note-taking strategies. We propose that there are several ways in which teachers and students can work together to improve this situation.

First, teachers can help students to implement successful strategies and methods of note-taking, such as the Five Rs , mind-mapping, categorization, and problem-awareness. Second, according to our data, teachers will be able to further assist by indicating to students what the key content of class notes should comprise. Third, teachers should consider allowing extra time for students to think about and take notes in class.

In addition, at the beginning of each unit, teachers might tell students the objectives and tasks and ask them to take notes accordingly. After the completion of each unit, the teacher could also summarize the learning objectives, tasks, and main points of the unit and send these to students in categories to supplement and improve the quality of their notes. This process would offer students an opportunity to review and reflect on what has been learned in class, which will, in turn, help them decide on appropriate note-taking strategies.

Finally, as mentioned above, teachers might consider increasing the difficulty of tests, instead of simply highlighting key points in the exam paper before a test, which should encourage students to take better class notes. It is generally accepted that practice makes perfect, and only through constant practice will students be able to develop their note-taking ability.

In turn, students should endeavor to actively learn a variety of note-taking strategies, take notes in class more regularly, summarize the note-taking strategies suitable for them in practice, and stick to them to make note-taking a habit, so as to improve their academic performance and enhance their lifelong learning ability.

6. Conclusion

In the era of information technology, when the online teaching has become increasingly common, we can not only encourage it, but also make proper adjustment with the development of science and technology in a timely manner to continuously optimize it, so as to better develop the students' ability

ISSN 2616-7433 Vol. 3, Issue 7: 77-83, DOI: 10.25236/FSST.2021.030714

of life-long learning to meet the requirement of the society.

References

[1] Bui, D. C., Myerson, J., & Hale, S. (2013). Note-taking with computers: Exploring alternative strategies for improved recall. Journal of Educational Psychology, 105(2), 299–309.
[2] Hou, B. (2017). Analysis of the phenomenon of university students not taking notes under the information technology environment. Chinese Education Technology & Equipment, 2017(18), 116–118.
[3] Liu, H. (2019). Investigation and reflection on the current situation of college English class notes. Overseas English, 22(11), 153–154.
[4] Song, D., Liu, D., & Fu, Y. (2017). The influence of problem awareness on academic performance: The mediation of note-taking strategies – based on the content analysis of university students' note-taking texts. Research on Psychology and Practice, 15(5), 683–690.
[5] Sujatha, R., Vijayalakshmi, R., Prabhakar, S. S., & Krishnamoorthy, P. (2020). ENotes: Note taking tool for online learners. In A. P. Pandian, T. Senjyu, S. M. S. Islam, & W. Haoxiang (Eds.), Proceeding of the International Conference on Computer Networks, Big Data and IoT (ICCBI 2018) (pp. 960–967). Cham, Switzerland: Springer.
[6] Zhang, J. (2014). Teaching materials should not use notes on mobiles: The university classroom has been kidnapped by the PPT. http://news.xinhuanet.com/edu/ 2014-06/23 / c_1111269187. HTM. Accessed 12 November 2019.