

The application of a micro-blog platform in the teaching of C programming

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ABSTRACT: Micro-blog, a platform for information sharing and spreading that is based on user relationships, supports cross-platform exchange and seamless connection with mobile devices. This article presents the introduction of a micro-blog platform into the classroom instruction of C programming at Xi'an Jiaotong University in China. The impact of applying micro-blog to the teaching of this subject has been verified via a questionnaire survey of participants. The survey results demonstrate that micro-blog plays a significant role in enhancing communication between teachers and students, thus, improving the acquisition of knowledge and learning interest.

INTRODUCTION

The blog (Weblog) as a new medium of communication can be introduced into course teaching [1]. Micro-blog, a platform for information sharing and spreading that is based on user relationships, is a blog through which users can release up to 140 characters of information through channels, such as browsers, mobile phones, instant message software (MSN, QQ, Skype, etc) and external API interfaces [2]. Micro-blog is characterised by cross-platform communication, seamless connection with mobile devices, and a decentralised and people-oriented philosophy. It has already been valued by many scholars in educational circles [3][4].

C programming is a computer-related basic course [5]. During the teaching process, students often present unexpected responses such as *...I can understand, but I cannot program...* or *...I am gradually losing my interest in learning...*, which was related to the characteristics of this course, course schedule and the knowledge background of the students. The traditional teaching method with a blackboard or *Blackboard + PowerPoint* can hardly be absolved of blame. Based on the background of course teaching indicated above and according to the theme of developing an *effective application* of educational technology, the author introduced the classroom instruction of C programming (in a *Computer Software Engineering* major, second semester for freshman) into micro-blog in an effort to improve the teaching effect of this course, and to explore the rules, opportunities and problems of micro-blog when it is applied to the subject teaching process.

APPLICATION FLOW OF MICRO-BLOG IN THE TEACHING OF C PROGRAMMING

When introducing micro-blog into classroom teaching of C programming, the author followed the steps shown in Figure 1.

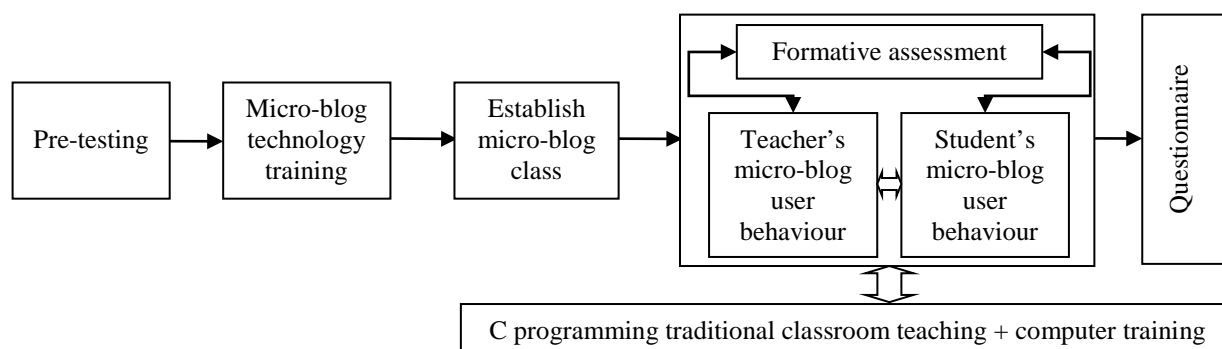


Figure 1: Flowchart of introducing micro-blog into C programming classroom.

As can be seen in Figure 1, the elements of this process are pre-testing, micro-blog technology training, constructing a micro-blog class, formative assessment, teacher's micro-blog user behaviour, students' micro-blog user behaviour, questionnaire and traditional classroom teaching of C programming + computer training in computer rooms.

Pre-testing

Based on the requirements of this research, the author developed a questionnaire survey independently for pre-testing. Conditions covered in the pre-testing questionnaire included information on the proportion of students with a mobile phone, surfing the Internet using a mobile phone, the PC ownership rate and proficiency with micro-blog technology. The purpose of the pre-testing was to confirm whether basic conditions for carrying out this research were satisfactory, and to provide the basis for follow-up arrangements.

The pre-testing showed that 100% of participants owned a mobile phone and most students know how to go on-line with a mobile phone. The PC ownership rate was 26.3%, the participants already had certain information literacy and most students used blogs. Some of them had heard of micro-blog, but they had not yet used it. They were interested in this experiment, and did not mind spending an additional five yuan on mobile Internet access fees. Conditions for the implementation had almost been prepared.

Micro-blog Technology Training

The participants' proficiency in certain technologies is regarded as the premise for carrying out the application of this technology in the classroom. The author was able to learn from the pre-testing that the participants were unfamiliar with this emerging technology. Thus, technology training before implementation was a necessity. By taking advantage of computer classes, the author conducted micro-blog training for students in one lesson, so that they knew how to register, log in, find people, set up groups, follow classes and release messages on mobile devices and browsers. In addition, they were required to review after class for consolidation.

Establishment of a Micro-blog Class

When micro-blog technology was mastered, the author and 39 students registered for the micro-blog. For the convenience of management and supervision, it was suggested that the students use their real names or similar. After registration, the students followed the teacher or other students to form a P2P micro-blog class. As the leader of this micro-blog, the author selected a student as an assistant for auxiliary management. In addition, in order to guarantee a sound learning environment, students were required not to follow users of other classes before the end of this teaching practice.

Specific Application of Micro-blog in Teaching

When the micro-blog class was set up and, when different micro-blog user behaviour was carried out by the teacher and students, the micro-blog class was officially launched as an auxiliary of the traditional C programming. The teacher's micro-blog user behaviour includes the release of important knowledge points from the chapter being taught, typical examples, homework, learning method, opinion collection, feedback of students' questions, as well as supervision, management, inspiration and guidance relating to students' behaviour, etc. Students' micro-blog user behaviour includes reading material on knowledge points, examples, programs, learning methods, raising questions, participating in discussion, putting forward opinions and suggestions, etc. The formative assessment formed from this process was of great importance, because not all the links could have been taken into full consideration before implementing the educational application of a new technology. Timely adjustments, modifications and improvements were required during the implementation stage.

Questionnaire

When approaching the end of the course teaching, the author distributed a questionnaire to the whole class in an effort to learn about specific conditions relating to the application of the micro-blog in teaching. The questionnaire description and data analysis are shown in the Investigation and Analysis section of this article.

It is important to note that the whole process was done during the normal implementation of traditional classroom teaching. The introduction of the micro-blog does not replace the traditional classroom, but it is intended to serve as a beneficial supplement to it.

INVESTIGATION AND ANALYSIS

Introduction to the Questionnaire

The questionnaire was a self-designed questionnaire, covering three themes: *the effect of the micro-blog application, the micro-blog usage scenario; technological improvement of the micro-blog* and *the advantages of the micro-blog in education*. Between three to nine options were available for the themes, and the Likert scale was adopted for the

responses to each option. The scale was divided into *strongly agree* - 5, *agree* - 4, *neutral* - 3, *disagree* - 2 and *strongly disagree* - 1. There were seven options in the first theme *effect of the micro-blog application*, in addition to which there were two open-ended questions checking the extent of each student's professional literacy. The average value was taken from the scores for follow up analysis of the relevant data. After analysis of the three themes of the questionnaire, it was found that the α values of the themes were 0.8359, 0.7877 and 0.7723, respectively, indicating that the questionnaire had high reliability. Thirty-nine questionnaires were distributed, and 37 were collected of which 36 were valid. The effective response rate was 97.3%. After collecting the questionnaires, SPSS11.5 professional statistical software was used to undertake statistical analysis. The main statistical methods adopted were general descriptive statistics, reliability analysis, factor analysis, etc.

Results and Analysis

Effects of the Micro-blog Application

The author introduced micro-blog into classroom teaching, so that the learners made different progress with the course content, learning method, learning interest, student-teacher communication, etc. Specific data are shown in Table 1.

Table 1: Learning condition after using micro-blog.

| | Strongly agree % | Agree % | Neutral % | Disagree % | Strongly disagree % |
|-----------------------------|---------------------|------------|--------------|---------------|------------------------|
| C language knowledge | 25.00 | 36.11 | 27.78 | 2.78 | 8.33 |
| Learning method | 5.56 | 19.44 | 47.22 | 22.22 | 5.56 |
| Examples in C language | 8.33 | 44.44 | 30.56 | 16.67 | 0.00 |
| Programming ability | 0.00 | 19.44 | 33.33 | 41.67 | 5.56 |
| Communication with teachers | 38.89 | 16.67 | 27.78 | 13.89 | 2.78 |
| Communication with students | 13.89 | 30.56 | 13.89 | 22.22 | 19.44 |
| Learning interest | 19.44 | 25.00 | 30.56 | 16.67 | 8.33 |

According to the results obtained, it can be seen that 25% of students demonstrated considerable improvement in their learning of the C language with the help of micro-blog, and 36.11% of students made sound progress. In terms of the examples presented in the micro-blog, 8.33% of students believed that the examples were of great help to them, and 44.44% of students considered that they would contribute to their study.

After the comparison above, it can be seen that the learning effect of presenting the knowledge points was better than that of presenting the examples. Obviously, this relates to a micro-blog in which a message is limited to 140 characters and large paragraph data cannot be systematically presented. Furthermore, it is important to note that the concept of *grinder* was adopted in this teaching practice, in which a large paragraph of content that was recorded in blogs was released in the form of a URL in micro-blog. On this basis, an association between micro-blog and blog can be established, which can make up for the technology limitation of micro-blog. The survey data in Table 1 were based on this measure, but the effect of presenting examples was still not as effective as that of presenting knowledge points. If the *grinder* strategy was not adopted, the learning effect of examples would have been worse, because the author was impressed by the teaching process.

In terms of the learning method presented in the micro-blog, 25% of students believed that it was of great help or contributed a lot to their learning; 47.22% of students believed that impact was neutral, accounting for the low proportion of students that disagreed to some extent. This is mainly because this type of learning was *added* during the middle and later periods of teaching, and not much learning guidance was provided to each chapter learnt. Despite obtaining such good results in this investigation, the author still suggests that guidance in the learning method should be provided during this process.

The cultivation of programming ability is the core of C programming, which can only be reached with a computer. In terms of the role of the micro-blog in improving programming ability, 47.23% of students selected no help, 33.3% selected *neutral* and only 19.44% of students selected the application of micro-blog was of help in improving the programming ability. Hence, micro-blog plays little role in improving programming ability. It also shows that certain limitations exist in the cultivation of targets where real practice is a necessity.

In terms of promoting communication via micro-blog, the overall result was significant according to the data shown in Table 1. In terms of the improvement of the teacher-student relationship and student-student relationship, certain differences are notable. This was mainly because students who could meet each other in person frequently would make

little improvement in communication via micro-blog. In contrast, the teacher-student relationship would be greatly boosted because of the few opportunities to communicate with each other.

In terms of improving the learner's interest in learning via micro-blog, 44.44% of students believed that their interest in learning C language via micro-blog was significantly or greatly improved; and 30.56 % of students selected neutral and 25.00% selected no help. Thus, the interest of learning C language programming via micro-blog was helpful, but was not as significant as expected. Apart from micro-blog, interest in learning is also closely related to organisation leadership, learning habits, learning conditions, etc.

In this teaching practice, significant improvement was made with students' thoughts about educational technology in addition to the learning factors mentioned above. Table 2 shows that in terms of problems related to *...discuss educational technology in one sentence*, 80.56% of students were able to answer it well or to give a good answer, and 16.67% of students' answers were almost qualified. With regard to problems related to *...apply certain new technology into the classroom, please write down the design thought*, 55.56% of students expressed very good or good opinions about the design thought, and 22.22% of designs were almost qualified. The freshmen, whose opinions can reach this level without having the knowledge of the subject in an all-around way were worth appreciating.

Table 2: The answer level of educational technology problem.

| | Good | Middle | Poor |
|---|--------|--------|--------|
| Discuss educational technology with one sentence | 80.56% | 16.67% | 2.77% |
| Apply certain new technology into classroom, please write down the design thought | 55.56% | 22.22% | 22.22% |

Usage Scenario of Micro-blog

The usage scenario of micro-blog refers to the situation where the learners were using micro-blog. This survey helps one to understanding the learners' preference or would provide a useful reference for the selection of the strategies in using micro-blog. The survey responses are shown in Table 3.

Table 3: Usage scenario of micro-blog.

| | Strongly agree % | Agree % | Neutral % | Disagree % | Strongly disagree % |
|---|------------------|---------|-----------|------------|---------------------|
| Preview | 2.78 | 2.78 | 16.67 | 55.56 | 22.22 |
| Review | 16.67 | 27.78 | 27.78 | 22.22 | 5.56 |
| General review for final examination | 30.56 | 52.78 | 13.89 | 2.78 | 0.00 |
| Communicating with teachers and students when encountering problems | 41.67 | 36.11 | 13.89 | 5.56 | 2.78 |
| Checking homework after class | 55.56 | 27.78 | 8.33 | 8.33 | 0.00 |

According to these statistics, students who previewed lessons with micro-blog accounted for 5.56%, while the proportion of preview without micro-blog reached 77.78%. The proportion of review with micro-blog frequently or a lot accounted for 44.45%; the proportion of general review for the final examination frequently reached 83.34%; the proportion of communicating with teachers and students frequently when encountering problems reached 77.78%; and the proportion of checking homework with micro-blog after class reached 83.34%.

The data showed that the learners' preference for using the micro-blog were concentrated in *general review for final examination*, *checking homework* and *communicating with teachers and students when encountering problems*, indicating that these three application strategies were suitable for the teaching of this course. The survey results also showed that students mainly engaged in passive learning or examination-oriented learning in this teaching programme.

Even though a higher proportion of *teacher-student* communication can reflect a student's initiative to some extent, other links that can reflect positive learning, such as *preview before class* and *review after class* accounted for smaller proportions, while 83.34% of *checking homework after class* or *general review for final examination*, which have evident signs of passive learning or examination-oriented learning, also illustrated this problem.

Advantage of Micro-blog Education

Micro-blog is considered to be an advanced medium of Web2.0. The following question arises: what kind of educational advantages will be embodied in micro-blog? The opinion of students with their experience will be of great

value for reference. In this survey, 97.22% of students believed that micro-blog was suitable for *teacher-student communication and feedback*, as well as for *presenting knowledge*; 83.34% of students believed that micro-blog was suitable for providing guidance on the *learning method*; in terms of *presenting examples and programs*, as well as *assigning homework*, the support rates were 77.78% and 75%, respectively, as shown in Figure 2.

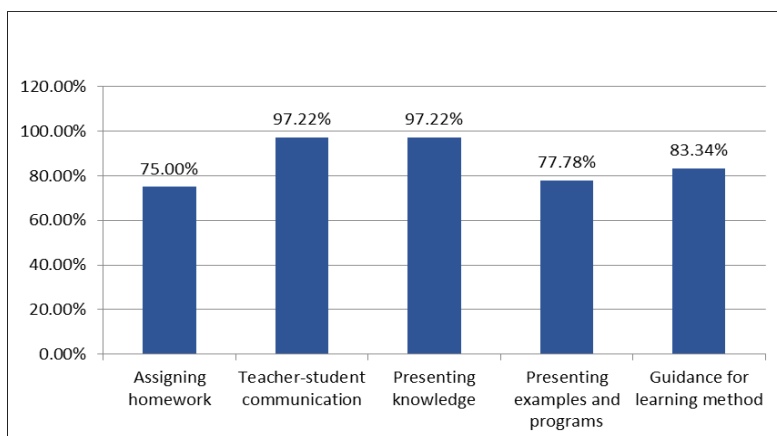


Figure 2: Educational advantage of micro-blog.

The survey results concerning this theme showed that micro-blog plays a significant role in enhancing teacher-student communication, collecting opinions and presenting fragmented learning resources, but was rather poor in presenting *examples and programs* with large paragraphs. This conclusion was consistent with the survey results of theme one and theme two. It is important to note that *assigning homework* had a support rate of 83.34% during the application process even though students did not consider it to be an educational advantage of micro-blog (see Table 3). This indicated that students were required to readjust their learning strategies or to obtain more guidance during this stage.

CONCLUSIONS

As an emerging technology, micro-blog still has a long way to go in its application to teaching. The author introduced it into C programming and conducted a positive and significant attempt in using it in teaching practice.

Based on the experience and the survey results, the educational and teaching characteristics of micro-blog could be summarised as follows: 1) micro-blog plays a significant role in promoting teacher-student communication, and such teaching strategies as on-line communication, theme discussion, opinion collection and teamwork between teacher and students can be successfully carried out; 2) micro-blog supports fragmented learning and such teaching activities as knowledge learning, guidance for learning method, assigning homework can be conducted successfully; and 3) if properly organised, micro-blog can improve the learners' learning interest, motivation and the teaching effect.

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