How College Teachers Use Social Media in Teaching during Emergencies: An Empirical Analysis Based on Structural Equation Modeling

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Abstract: College teachers constitute the leading force in the development of college teaching activities, whose attitude towards social media in teaching activities directly affects the maximum effectiveness of social media in college teaching. Based on the planned behavior theory, this paper conducts an empirical investigation and analysis on the factors influencing college teachers' adoption of social media in teaching. The study found that college teachers' behavioral intention to adopt social media in teaching is a result of such factors as perceived usefulness, perceived ease of use, expected benefits, community opinions and self-efficacy. Finally, according to the research conclusions, it is proposed that online teaching assessment based on social interaction should be reinforced during emergencies, and the teaching innovation achievements based on information technology should be appropriately commended, which provides some reference for guaranteeing teaching quality during emergencies.

1. Introduction

A sudden emergency at the beginning of 2020 has profoundly affected all aspects of people's life, work and study. Owing to the abnormality and easy recurrence of emergencies, teachers in the education field always need to prepare for online classroom teaching on a regular basis under the ideological guidance of "suspending classes without stopping learning". The emergency greatly limits the offline social activities of teachers and students. According to the social compensation psychology, certain online social activities are required through social media to compensate for the insufficient offline social interaction. Hence, online teaching based on social media meets learning needs during emergencies. With its high-level participation and socialization characteristics, social media provides suitable technical support and service paradigm for the learning reform of colleges and universities in the information age, becoming an important supporting technology and platform for college online teaching [1]. The willingness of college teachers to adopt social media in teaching activities is the main factor deciding whether social media can exert the maximum efficiency in

college teaching. Then, what factors will affect college teachers' adoption of social media online teaching? In front of these factors, what mental changes should managers and teachers make? Studying these issues means great significance for improving online teaching quality in colleges and universities during emergencies.

2. Material and Methods

2.1. Theoretical Model Construction

Anatoliy et al. [2] found that work effect expectations, effort expectations, convenience conditions and social influence greatly affect teachers' behavioral intentions to use social media.Dileket al. [3] found that expected benefits, job relevance, perceived usefulness, and perceived ease of use positively affect behavioral intentions. Jana et al. [4] proposed that innovation consciousness, social media knowledge, and pressure from leaders, colleagues and students have certain influences on teachers' willingness to use social media. Samuel et al. [5] found that perceived usefulness, perceived ease of use, and expected benefits are important factors affecting teachers' adoption of social media. Wang Zhuoyu et al. [6] found through investigation that teaching conditions, social influence, teaching expectations and effort expectations play an important role in affecting college teachers' adoption of WeChat in teaching. Xu Meidan et al. [7] found through research that college teachers' willingness to use WeChat as teaching assistance varies greatly in terms of gender, age, experience, and education. Li Yi et al. [8] found that regional and inter-school differences greatly affect teachers' willingness to adopt information technology. The above research suggests that there are internal factors, external factors and moderating factors affecting teachers' adoption of social media teaching, among which external factors mainly include social influence, teaching conditions and work relationship, etc. internal factors mainly include self-efficacy, perceived usefulness, perceived ease of use, expected benefits, and job performance expectations. Based on the above analysis and combining planned behavior theory, this study identifies 12 variables including perceived usefulness, expected benefits, self-efficacy, etc. and establishes the theoretical model shown in 1. The following hypotheses are made.

2.1.1. Subjective Norms and Behavioral Attitudes

Subjective norm means a teacher's certain teaching behavior is influenced by important people around him [9]. Behavioral attitude refers to college teachers' willingness to use social media in online teaching [10]. The specific research hypotheses are made as follows.

Hypothesis H1: Subjective norm positively affects college teachers' behavioral intention to adopt social media in online teaching during emergencies.

Hypothesis H2: Behavioral attitude positively affects college teachers' behavioral intention to adopt social media in online teaching during emergencies.

2.1.2. Perceived Behavioral Control and Self-Efficacy

Perceived behavioral control means teacher's subjective perception of the difficulty in controlling a certain teaching behavior [11]. Self-efficacy refers to teachers' subjective perception of whether they have the ability to accomplish a certain teaching goal. Relevant studies have shown that higher self-efficacy will produce higher levels of behavioral intention and use behavior [12].

Hypothesis H3: Perceived behavioral control positively affects college teachers' behavioral intention to adopt social media in online teaching during emergencies.

Hypothesis H4: The self-efficacy behind college teachers' adoption of social media in online teaching during emergencies positively affects their perceived behavioral control.

2.1.3. Convenience Condition and Perceived Usefulness

Convenience conditions refer to the teaching resource support required by teachers to perform a certain teaching behavior [9]. Perceived usefulness means teachers' subjective perception that the use of a certain teaching technology can uplift teaching performance [13].

Hypothesis H5: The convenience condition making college teachers adopt social media in online teaching during emergencies positively affects their subjective norms.

Hypothesis H6a: The perceived usefulness felt by college teachers when using social media in online teaching during emergencies positively affects their behavioral attitudes.

Hypothesis H6b: The perceived usefulness felt by college teachers when using social media in online teaching during emergencies positively affects their behavioral intentions.

2.1.4. Perceived Ease of Use and Expected Benefits

Perceived ease of use means teachers' subjective perception of the effort required to master a teaching technology [13]. Expected benefit refers to teachers' expectation of attaining certain honors or rewards by using a certain teaching technology [14].

Hypothesis H7: The perceived ease of use felt by college teachers when using social media in online teaching during emergencies positively affects their behavioral attitudes.

Hypothesis H8: College teachers' expected benefits of adopting social media in online teaching during emergencies positively affect their behavioral attitudes.

2.1.5. Reference Groups

Considering that different reference groups have different expectations for individuals, by referring to related research, this study divides reference groups into superiors, peers, and inferiors. Existing studies have shown that reference group positively affects individuals' subjective norms [15]. The specific research hypotheses are made as follows.

Hypothesis H9: Superior opinion positively affects college teachers' subjective norms of adopting social media in online teaching during emergencies.

Hypothesis H10: Student opinion positively affects college teachers' subjective norms of adopting social media in online teaching during emergencies.

Hypothesis H11: Colleague opinion positively affects college teachers' subjective norms of adopting social media in online teaching during emergencies.

2.2. Data Collection

This study adopted the questionnaire survey method. The questionnaire consisted of two parts: the first part contains the respondents' basic information, and the second part contains 36 items used to measure the 12 variables proposed in the model. The 12 variables are subjective norm, convenience condition, behavioral attitude, perceived behavioral control, self-efficacy, perceived usefulness, perceived ease of use, expected benefit, reference group (superiors, colleagues and students) and behavioral intention, respectively. These items are all adapted based on existing related research in terms of wording and terminology to make the contents more appropriate for the theme of this research. The questionnaire began in March 2020 and ended in June 2020. As to why this period is chosen, all colleges and universities across the country taught online during the period due to the emergencies, so the college teachers as the respondents would answer the questions more truthfully. The data collection area covers Shaanxi, Beijing, Inner Mongolia, Jiangxi, Anhui, Jiangsu and Zhejiang provinces, etc. In this study, a total of 287 questionnaires were distributed, 265 questionnaires were recovered, and 21 invalid questionnaires were excluded to finally collect

214 valid questionnaires, with an effective rate of 85%.

3. Results

3.1. Reliability and Validity Analysis

In this study, the questionnaire reliability was analyzed based on Cronbach's α, and the general criterion proposed by Fornellwas taken as the reference standard (αvalue greater than 0.8 indicates good questionnaire reliability, and α value between 0.7 and 0.8 indicates acceptable questionnaire reliability). SPSS 24.0 was used to analyze the overall reliability of the scale and the reliability of each subscale, finding that the α coefficient value of the total scale was 0.872, and the α coefficient value of each subscale exceeded 0.850. Hence, the reliability of the questionnaire in this study is high.
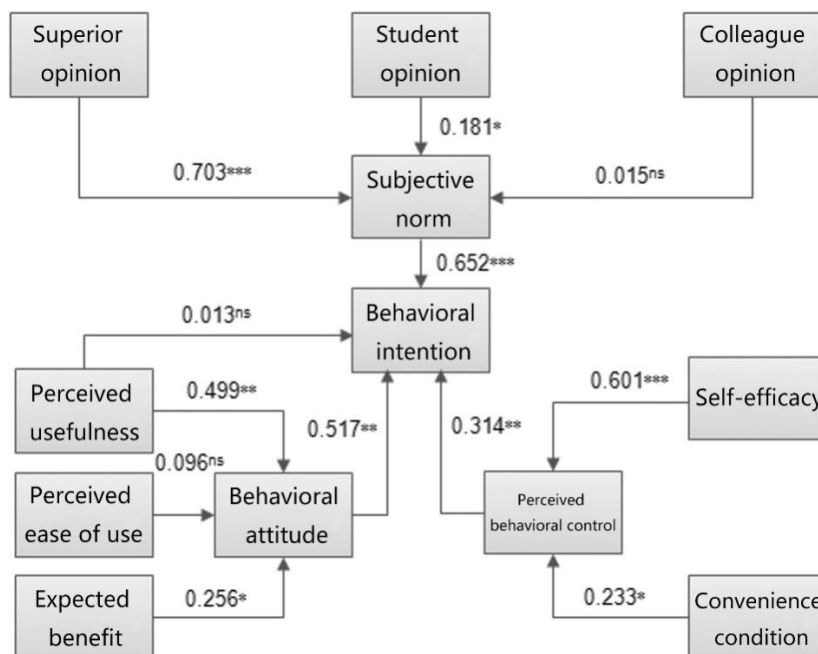
3.2. Research Conclusions

Figure 1: The path analysis on the factors influencing college teachers' adoption of social media teaching

Based on model testing, the path coefficients and verification conditions of each hypothesis are shown in Figure 1. The results suggest that subjective norm ($\beta=0.652$, $p<0.001$), behavioral attitude ($\beta=0.517$, $p<0.01$) and perceived behavioral control ($\beta=0.314$, $p<0.01$) significantly affect college teachers' behavioral intention. Where, subjective norm has the strongest positive effect, so hypotheses H1, H2 and H3 are all established. Self-efficacy has a great positive effect on college teachers' perceived behavior control ($\beta=0.601$, $p<0.001$), convenience condition has a certain positive effect on college teachers' perceived behavior control ($\beta=0.233$, $p<0.05$), so it is hypothesized that H4 and H5 are established. Perceived usefulness ($\beta=0.499$, $p<0.01$) and expected benefits ($\beta=0.256$, $p<0.05$) exert positive effects on college teachers' behavioral attitudes to varying degrees, but perceived ease of use has insignificant effect on teachers' behavioral attitudes ($\beta=0.096$, $p>0.05$), so is true for the effect of perceived usefulness on college teachers' behavioral intentions ($\beta=0.013$, $p>0.05$). It is probably because there is low threshold for the use of social media, and

most college teachers have no major obstacles in using social media, then perceived ease of use exerts little effect on behavioral attitudes. As to why perceived usefulness has little effect on behavioral intention, it may have no direct relationship with these two factors, but the correlation requires the intermediate variable of behavioral attitude. Here, it is hypothesized that H6a and H8 are established, but H6b and H7 are not established. Superior opinion ($\beta=0.703$, $p<0.001$) and student opinion ($\beta=0.181$, $p<0.05$) have positive effects on teachers' subjective norms to varying degrees, but colleague opinion has in significant effect on teachers' subjective norms ($\beta=0.015$, $p>0.05$). We found through interviews that the reason is that college teachers rarely exchange teaching experience. Here, it is hypothesized that H9 and H10 are established, but H11 is not established.

4. Conclusion

Based on the above conclusions, this study puts forward the following suggestions to uplift the online teaching quality of colleges and universities during emergencies.

4.1. Online Teaching Assessment based on Social Interaction Should Be Reinforced during Emergencies

Through research, subjective norm is found to be the most important factor affecting teachers' adoption of social media in college online teaching during emergencies. Superior opinion and student opinion have an important positive impact on college teachers' subjective norms, but colleague opinion plays an insignificant role. For its reason, in addition to the insufficient teaching communication between teachers during emergencies, the main reason is that superiors and students participate in the teaching assessment of college teachers, while colleagues generally do not. Hence, teaching assessment is the most important factor affecting college teachers' adoption of social media in online teaching. Emergencies greatly limit the offline social activities of teachers and students. According to the social compensation theory, they need online social interaction to meet the basic social needs, and social media can just meet this psychological need. Accordingly, online teaching based on social media during emergencies balances the two attributes of socialization and learning, thus greatly improving the online teaching quality. Therefore, online teaching assessment based on social interaction should be reinforced during emergencies, so that teachers preferentially select social media platforms in online teaching.

4.2. The Teaching Innovation Achievements based on Information Technology Should Be Appropriately Commended during Emergencies

The above research suggests that behavioral attitude is an important factor affecting teachers' adoption of social media in college online teaching during emergencies, and perceived usefulness and expected benefits positively affect their behavioral attitudes. Hence, it can be seen that college teachers' motivation to adopt social media in online teaching is inevitably somewhat "pragmatic" and "utilitarian". However, this value orientation is also driven by the goal of maximizing teaching efficiency. With proper use, it can greatly boost teachers' enthusiasm and initiative to use social media for online teaching, thereby improving the online teaching quality in colleges and universities during emergencies. Information technology injects new vitality into teaching innovation in colleges and universities, but not all teachers are willing to proactively adopt new teaching technologies. Even in the case of emergencies requiring online teaching, a large number of college teachers still choose one-way live broadcast for online teaching. In this way, "cramming education" and "what I say goes" in offline classrooms are moved online, which undoubtedly greatly impairs

the online teaching quality during emergencies. However, some teachers avail of this opportunity to make bold teaching innovations through various social media, achieving certain teaching results. Here it is recommended that, we should commend and publicize these innovative teaching achievements based on information technology in various ways, so that more teachers can understand that information technology, especially social information technology, can well assist online teaching innovation, improve teaching effect, and increase perceived usefulness and expected benefits of adopting social media teaching.

4.3. Online Teaching Design Training Based on Social Media Should Be Regularly Organized during Emergencies

The above research indicates that perceived behavior control is an important factor affecting teachers' adoption of social media in college online teaching during emergencies, and self-efficacy and convenience condition positively affect their perceived behavior control. Hence, college teachers' internal confidence in use and external resource support are important factors deciding their adoption of social media in online teaching during emergencies. Complete online teaching during emergencies imposes a big challenge for most college teachers, because most teachers have never implemented online teaching, online teaching experience of some teachers may be just mixed teaching with partial online teaching. Very few teachers have tried such complete online teaching, which leads to insufficient self-efficacy. Therefore, online teaching design training based on social media should be regularly organized during emergencies, so that teachers can master basic online teaching design methods. In particular, teachers should give play to the role of social media in online teaching during emergencies by penetrating online interaction in the teaching process during teaching design. In addition, during emergencies, certain convenience conditions should be provided for teachers' online teaching, for instance, by recommending mature and stable social media online teaching software for them to download, providing teachers with office space and equipment for online teaching in schools, or safeguarding teachers' residential area network bandwidth, etc.

This study conducts an in-depth analysis on the factors influencing college teachers' adoption of social media teaching during emergencies, and puts forward countermeasures and suggestions for improving teaching effects. It carries certain guiding significance for teaching during emergencies, but there are also some shortcomings. For example, WeChat is the only social media investigated, and less attention is paid to other social media. In the subsequent research, it is necessary to further expand the social media types for deeper analysis.

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