A Study on Motivation of Second-year Students Enrolling in Math-through-English Teacher Training at a University in Vietnam

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ABSTRACT

This study aimed to examine the motivation of 31 sophomores taking the Math-through-English teacher preparation program at the Faculty of Mathematics, Hanoi National University of Education. The study's use of quantitative and qualitative methods revealed that the second-year students were mostly intrinsically driven and had a modest level of motivation to complete this integrated course. This contributed to affirming that teaching science subjects in English was somewhat essential and influenced students' learning and career orientation. The three most common motivators were the lecturers, the voluntary aspect of MTE learning, and the pleasant relationships with classmates. Given the study's findings, various suggestions are made to improve the course's efficacy in particular and the use of teaching sciences through English in Vietnam generally.

Keywords: Math-through-English, motivation level, intrinsic motivation, extrinsic motivation, motivational factors

Introduction

Globalization, which is characterized by the integration of the world's economies and the advancement of science and technology, has had a significant impact on global education in general and Vietnam in particular during the past few decades. In this setting, learning English, the world language, becomes crucial for success in all domains, particularly in the academic and professional domains.

By taking part in the signing of agreements like the TPP, ASEAN has expanded Vietnam's labor market. With more employment options comes more intense competition and stricter hiring standards. Employees must therefore possess both high levels of competence and sufficient foreign language proficiency. Vietnam has acknowledged the significance of increasing foreign language proficiency for the whole national education system, including English proficiency, and has given it tremendous attention as an active participant in the international integration process.

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There are several restrictions on the teaching and learning of English in Vietnam. The time has come to implement a fundamental and thorough reform of English language instruction, starting with new teaching strategies and higher teacher standards. Resolution 1400 (September 30, 2008) and Prime Minister's Decision No. 959 both approved the project "Teaching Foreign Languages in the National Education System for the Period 2008-2020." (June 24, 2010) mandates the teaching of the fundamental sciences, such as Math in English in all schools by the year 2020, with a target of 30% of schools in major cities by that time.

The application of teaching science topics in English in Vietnam is also supported by the prevalence of the trend of studying abroad. Several international bilingual schools and SAT/A-level preparation facilities have been built to adequately educate pupils to adjust to a new learning environment where all information is provided in English. Most Vietnamese instructors of math and other science disciplines in high schools lack the credentials to teach in English, while English teachers cannot teach science in English. In other words, there is a severe shortage of English-speaking scientific professors from Vietnamese universities. Vietnamese instructors will not be able to satisfy the rising education standards and will lose work possibilities in their own country if the status of pedagogical training is not changed.

As the top pedagogical university in Vietnam, Hanoi National University of Education (HNUE) has begun providing bachelor's degree courses in Mathematics taught in English since 2013. This is done with the support of the Ministry of Education and Training, specifically the National Foreign Language Project 2020. The program offers 50 training opportunities per year for math teachers who teach in English. The future of the supply of English-language science instructors in Vietnam is looking up thanks to this training program.

At the heart of any instructional strategy is motivation. Motivation is regarded as one of the significant variables to be measured in the process of language learning (Liang & Kelsen, 2018). According to Vo (2021), good evidence supports that L2 motivation could refer to the various purposes, not least of which is part of learning a second language. To improve the efficacy of teaching science courses in English in Vietnam, especially for subjects like students of Bachelor of Mathematics Pedagogy taught in English, research on learning motivation is required.

The research focuses on examining of the intensive English learning program with the intention of increasing the adoption of the integrated teaching approach in general and the training of scientific teachers in English in particular in Vietnam. The program for students holding a bachelor's degree in Mathematics Pedagogy taught in English at HNUE is investigated in terms of course time and English output requirements. To identify any parallels or variances, the the abovementioned elementsare contrasted with European standards. The goal of the study is to identify the elements that influence student motivation for learning (including the level and kind of internal and external motivation). A number of recommendations will be made based on the research's findings in order to increase learners' motivation, nurture motivating factors, and support teachers in constructing a competence framework for teaching science courses in English.

Literature review

Definition of Motivation

In his socio-educational model, Gardner (1985, p.10) states, "motivation refers to the combination of effort plus desire the objective of learning the language with positive attitudes about learning language." He decides to describe motivation by outlining its three components: (1) effort relates to the amount of time spent studying the language and the learner's motivation; (2) desire denotes the degree to which the learner aspires to language proficiency; and (3) affect denotes the learner's emotional responses to language study (Gardner, 1985, p.13).

Dörnyei and Ushioda (2013) described the Latin word "movera," which means "to move," as the origin of motivation. Motivation affects how we behave and what decisions we make. They used the direction and magnitude of the phrase to characterize motivation, and with certain points, they provided a more detailed definition of motivation. The fact that there are numerous different definitions demonstrates how difficult it is to describe the motivation and its significance in the learning process (Filgona et al., 2020).

According to Gopalan et al. (2017), the process of initiating, directing, and maintaining goal-oriented behaviors in learning is known as learning motivation. Motivation is a persuading emotion that prompts actions, a direction for our energy, an explanation for our behavior, and the "what" and "why" of what people do. From this point on, motivation fosters optimism regarding students' ability to successfully complete a task or activity, regardless of how challenging it may be (Ainley & Ainley, 2011; Gopalan et al., 2017). Nuridin (2019) agreed, "It is undeniable that motivation plays a key role in second or foreign language learning".

According to Crookes and Schmidt (1991), motivation has both internal and external components. Interest level, sense of significance, expectation of success or failure, and perception of reward are examples of internal factors. The overt decision to learn, a persistent learning habit, and strong participation are examples of external elements, on the other hand. As a result, learning only works when pupils are engaged in the material and work hard.

According to Lightbrown and Spada (1999), the motivation to acquire a second language may be summed up in terms of two factors: the communicative demands of the learners and their views toward the community of speakers of the second language. The author explains that learners would recognize the communicative value of the second language and be driven to become proficient in it if they need to speak it in a variety of social contexts or to pursue their professional goals. Similarly to this, if language learners feel positive about native speakers, they will want to interact with them more.

Types of Motivation

There are many different dynamic classification models. According to the Self-Determination Theory (Deci & Ryan, 1985), motivation can be classified into two basic categories: intrinsic motivation and extrinsic motivation. Intrinsic motivation is the motivation that motivates learners to perform activities voluntarily, stemming from a real interest in and satisfaction with that activity; extrinsic motivation is the driving force that motivates learners to conduct activities to achieve certain goals such as getting good grades, finding a job, settling down, etc. The differences between intrinsic and extrinsic motivation have attracted a lot of attention in

recent years in the field of EFL learning. According to Oletić and Nina (2014), "intrinsic or extrinsic motivation and the correlation between motivation and success in learning a foreign language have been examined".

Three categories of intrinsic motivation are identified by Dornyei (2001): (1) The intrinsic want to learn is the desire to "engage in an activity for the joy and satisfaction of comprehending something new, gratifying one's curiosity, and exploring the universe" (p.28); (2) The intrinsic motivation toward achievement is the feeling of satisfaction associated with attempting to surpass oneself, to overcome challenges, and to accomplish or create something; (3) The intrinsic motivation toward stimulation is the type of motivation to engage in an activity in order to experience pleasurable sensations stimulated by the activity itself (Dornyei, 2001, p. 149). According to Dornyei (2001), extrinsic motivation is divided into four subtypes: (1) external regulation refers to “the least self-determined form of extrinsic motivation, coming entirely from external sources such as rewards or threat” (p.28); (2) interjected regulation involves “ externally imposed rules that student accepts as norms to be followed in order not to feel guilty” (p.28); (3) identified regulation occurs when the student engages in an activity as he highly values and identifies with the behaviour, and see it useful to do, a student with the identified regulation may learn English because it is necessary for him to listen to English songs or watch films in English.; lastly, (4) integrated regulation indicates “choiceful behaviour that is fully assimilated with the individual’s other values, needs and identity” (p.28).

Integrative motivation is characterized by Mun (in Widesti, 2020) as motivation that lacks an external inducement (reward). Because of their good manners, students are motivated to study a foreign language through integrative motivation. According to Hanyeq and Suhatmady (2018), instrumental motivation is an incentive that motivates students to study a language with more practical linguistic objectives like applying for a well-paying job or gaining greater social standing.

There are many motivating factors, according to Harmer (1991), Dornyei (2001), and William (2011), including the group of factors about the teacher, the organic conditions of the educational institution, the learners' confidence, positive attitudes towards foreign languages and the foreign language community, the voluntary nature of learning, the absence of any outside influences, the class's attitudes, and the curriculum.

Research on Motivation

The motivation of teachers and learners is also an issue that attracts the attention of scientists (Gardner & Lambert, 1972; Deci & Ryan, 2000; Cook, 2001). Research on motivation is extremely diverse in terms of topics, subjects, and methods, and there are many quantitative studies using questionnaires that are referenced and synthesized from previous studies.

The majority of these studies' findings agreed with Gardner and Lambert's (1972) theory that learning a foreign or second language is necessary for a person's ability to interact socially with others who speak that language, known as integrative motivation, and for their ability to acquire knowledge and skills that can be used in that language, known as instrumental motivation.

Another research by Siriluck and Sirithip (2004) examined the connection between undergraduate students' motivation and English-language competency. The study made it very

evident that students with high English proficiency are more eager to integrate than those with poor English proficiency. Yet, there was no discernible difference in the two student groups' levels of instrumental drive. Also, the study demonstrated that students with high levels of English proficiency are more driven than students with low levels of English performance.

According to Masum (2016), "students learn the English language for practical reasons, i.e., get a good score in public exams, securing a good job, getting opportunities for higher education, and so on" (p. 185). In his study, Mohammad Rukanuddin (2014) hypothesized that students at the tertiary level are driven to learn English for practical reasons. Jenifara Zaman (2015) argues that in order to motivate their students' performance, both teachers and students should attempt to enjoy the learning process. According to P. Singh & M. Singh (2021), while students might have a strong desire to study, the teacher's external help profoundly impacts their learning. The teacher's capability to enhance students' competency, interest in the subject studied, and feelings of self-efficacy all affect students' motivation to study. Self-confidence also matters in learning, for a student's motivation will be lost if it is weakened (Lo, 2022).

According to Wimolmas (2013), Thammasat University students are a little more "instrumentally" inclined when it comes to studying English. Furthermore, students are integratively motivated to acquire this second language, according to Nidana's (2017) findings. Yamagami (2023) has explored the relationship between the L2 motivational self-system, students' perceptions of their English proficiency, and their attitudes toward translanguaging in Japanese EFL classrooms that examined this relationship using structural equation modeling (SEM) and analyzed changes in attitudes towards translanguaging by adopting the trajectory equifinality approach (TEA).

Research Questions

To fulfill the purpose of the study, the survey sought to answer the following research questions:

1. To what extent is the learning motivation of students with a Bachelor of Mathematics Pedagogy taught in English?

2. Do intrinsic or extrinsic motivations have a greater influence on students of the Bachelor of Mathematics Pedagogy taught in English when participating in the course?

3. What factors motivate students of Bachelor of Mathematics Pedagogy taught in English?

Methods

Pedagogical Setting & Participants

In general, the Bachelor of Mathematics Pedagogy program taught in English is equivalent to a high-quality Bachelor of Mathematics Pedagogy program, but with an additional 28 credits (420 hours or 350 hours) for the English program. Intensive English (taught by a lecturer in the Department of English Education) is taught in the first four semesters. Students have to complete 350 hours of intensive English language study at the university. The student's English output standard is equivalent to B2, according to the CEFR. According to the Guided learning hours of CEFR, learners should devote between 500 – 600 hours to studying to achieve the B2

level. In the context that students' English entry level is relatively low and inconsistent, from A1 - B1 (Nguyen, 2014), 350 hours are insufficient for students with an equivalent input level A1/A2 to achieve English output standards. Therefore, adding to the program some additional English credits will be necessary and effective for students to have the opportunity and time to acquire and practice English, a necessary condition for students to access specialized knowledge in Mathematics and transmit that knowledge in future careers.

The questionnaire was given to 31 students at the Faculty of Mathematics, Hanoi National University of Education. 20 students out of 31 students participated in answering interview questions.

Design of the Study

The study was conducted using a combination of qualitative and quantitative methods to investigate the research questions. The questionnaires for students were written in English and translated into Vietnamese to ensure they could understand the researcher's requirements and study purposes thoroughly. It contained 20 questions that investigated the learning motivation of sophomores taking the Math-through-English teacher preparation program at Hanoi National University of Education's Faculty of Mathematics. The interview used in this study contained one open-ended question to investigate the time students utilized to study English by themselves.

Data collection & analysis

Data type	**Data collection instruments**	**Data analysis instruments**	**Data presentation instruments**
Quantitative data	**Survey questionnaire** **Part 1:** A 5-point Likert scale with 20 questions to determine the level of motivation and type of learning motivation of the participants (intrinsic/ extrinsic motivation) was carried out in the second semester of the school year 2022-2023. The scale has 5 levels of choice from strongly agree to strongly disagree. The content of the scale course is referenced from the Attitude/Motivation Test Battery formula (Gardner, 1972; 1985) with adjustments to suit the participants and research objectives. The 20 questions are divided equally into 2 groups: Group of questions about intrinsic motivation: questions 1, 2, 6, 8, 9, 12, 13, 14, 15, 19 Question group on extrinsic motivation: questions 3, 4, 5, 7, 10, 11, 16, 17, 18, 20 ***Part 2:*** A multi-choice sentence table includes 9 groups of motivational factors.	**SPSS software** ***Descriptive statistic*** Calculate mean (and standard deviation) scores to assess motivation level and type Rating criteria: 1.00 – 1.33: low motivation 1.34 – 3.67: average motivation 3.68 - 5.00: high motivation ***Descriptive statistic*** Calculate the frequency of the factors Cronbach's alpha calculates the reliability of the scale	Microsoft Word and Microsoft Excel

Qualitative data	**Interview with an open-ended question:** "How much time do you spend on studying English by yourself after class?" The answers are classified into specific groups.	**SPSS software** ***Descriptive statistic*** Calculate the frequency of the answers	

Findings and Discussion

Learning Motivation of Students with a Bachelor of Mathematics Pedagogy Taught in English

Table 1.

Mean and assessment of intrinsic motivation

Intrinsic motivation	Mean	Standard deviation	Motivation level
Question 1	3.8387	.93441	High
Question 2	3.4516	1.20661	Average
Question 6	3.8065	.70329	High
Question 8	3.1935	.87252	Average
Question 9	3.7742	1.11683	High
Question 12	2.9355	.99785	Average
Question 13	3.0968	1.07563	Average
Question 14	3.2258	.99028	Average
Question 15	3.8065	.74919	High
Question 19	3.2903	.69251	Average
Mean of Measure	3.4419	.93391	Average

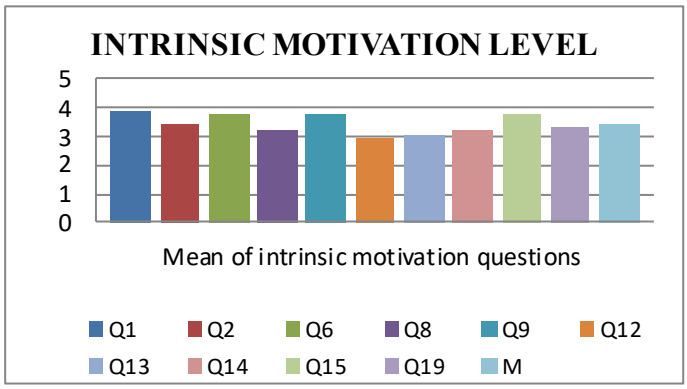

Figure 1. The mean of intrinsic motivation questions

Accordingly, students had an average intrinsic motivation (M = 3.4419). Question 1 (I enjoy learning Math in English) had the highest average score (M = 3.8387), followed by question 6 (I am interested and want to learn about teaching methods of Math in English), question 9 (I study Math in English quite well and understand the importance of English, so I enjoy studying

Math in English) and question 15 (I study Math in English voluntarily and always voluntarily to study to improve study habits). High scores in all four of the questions as mentioned above indicated a high level of intrinsic motivation. Although it was still assessed as having average motivation, question 13 (I admire/love the teacher who teaches Math/English/Math in English) had the lowest mean score (M = 3,0968).

Subsequently, passion for English, subject content, integrated subject, methods of teaching science subjects in English, and confidence were internal factors that created high learning motivation for students (Questions 1, 6, 9). Besides, the intrinsic motivation motivated students to participate in the course voluntarily (Question 15). Students studied this programme to become Math teachers to teach Math through English because of their own aspirations. With intrinsic motivation, students were more actively engaged in learning. The results also showed that novelty, interest, and support of the integrated lesson contributed to students' intrinsic learning motivation (Question 19). Students have been much inspired to learn Math through English because of the significant pedagogical differences between integrated teaching techniques and conventional approaches. Another impressive outcome was Math through English teachers' impact on their students. Students preferred to follow the teachers they respect; therefore, this would assist them in making professional decisions in choosing their careers. In conclusion, students with average intrinsic motivation would feel free to complete academic assignments, actively engage in class to pursue their preferences, and feel that the course is meaningful and useful to achieve their long-term objectives.

Table 2.

Mean and assessment of extrinsic motivation

Extrinsic motivation	**Mean**	**Standard deviation**	**Motivation level**
Question 3	2.7742	1.08657	Average
Question 4	4.0323	.83602	High
Question 5	3.2903	1.07062	Average
Question 7	2.6129	1.38269	Low
Question 10	3.0968	.94357	Average
Question 11	3.1613	.89803	Average
Question 16	3.7419	.96498	High
Question 17	4.3226	.65254	High
Question 18	4.0323	.83602	High
Question 20	3.1935	.83344	Average
Mean of Measure	3.4258	.9836	Average

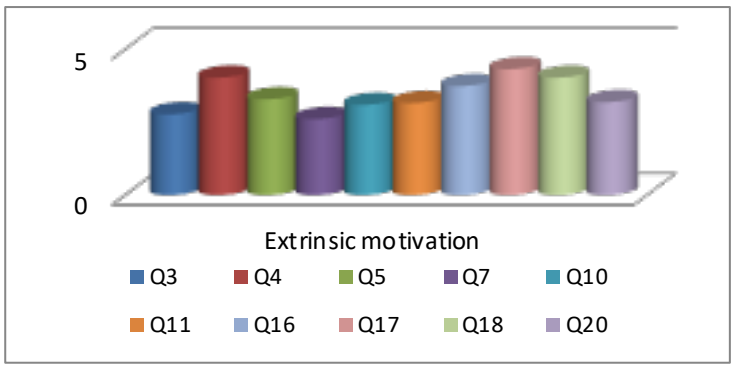

Figure 2. Mean of extrinsic motivation questions

The mean of the questions belonging to the extrinsic motivation group was presented in Table 2. With the mean of all 10 questions being 3.4258, students had average extrinsic motivation. One notable difference between the data for the two types of motivation were that three questions in the extrinsic motivation exceeded the score of 4.00, while none in the intrinsic motivation achieved that mark. Question 17 (I just want to pass the test/get a university degree to apply for a job without caring about major) was the one with the highest score (M = 4.3226) and showed that the students had extrinsic motivation at a high level while question 7 (I study Math/English/Math in English just to satisfy the wishes of my friends/relatives) was the question with the lowest result and showed a low extrinsic motivation (M = 2.6129). The other three questions that also showed a high level of motivation of learners were question 4 (I am studying for a Bachelor's degree in Mathematics pedagogy in English because this is a trendy career with a high income and a major trend in the future), question 16 (I want to read and understand Mathematical documents in English to serve my study and research), and question 18 (I learn how to think mathematically and logically in English directly). The remaining questions show average motivation.

Thus, in terms of extrinsic motivation, the factors related to career prospects, undergraduate/ graduate education and professional development motivated students to a high level of learning and teaching Mathematics in English (Questions 4, 16, 17, 18). In other words, students could achieve their practical goals by learning to teach Math in English. The potential practical benefits that could be achieved through a high level of expertise in integrated subjects were both the learners' goal and motivation. This fact further reinforced the importance of teaching and learning Mathematics in English, which students also acknowledged and appreciated. However, having students with average extrinsic motivation also posed challenges for educators. Since extrinsic motivation was synonymous with taking an action to gain a benefit, learners will become disinterested in learning when the benefits motivate students to learn and reach their goals disappear. Therefore, to prevent the disappearance of beneficial factors, the teachers must maintain and strengthen the external motivation and nurture the student's internal motivation simultaneously. Only in this way can enthusiastically learning behaviors be formed.

In general, students were moderately motivated to take the course to become a Math teacher in English, while Loima and Vibulphol (2016) found contradicting findings in the regional study that a high level of motivation was found among Thai students. This relatively high degree of

enthusiasm to learn English has been seen in other EFL situations as well (Cho, 2012; Fan & Feng, 2012; Winewska, 2013), which supports the idea that English is a necessary skill for individuals all over the world (Fiedler, 2011; Johnson, 2009). The reason for this is that the samples in this study are Vietnamese, while in Wong's study (2011), the samples are primarily Chinese students. Moreover, students know the importance of learning English as it is the world's lingua franca and as the language for STEM (Science, Technology, Engineering, and Mathematics) education (Nair, 2020).

More specifically, learners were more motivated by intrinsic motivation than by extrinsic motivation, although the difference was relatively small. The research by Achmad and Yusuf (2016) revealed similar results, showing that university students in Aceh enrolled in secretarial programs showed a greater intrinsic drive to learn English than extrinsic incentives. The students concur that studying English is crucial in today's world as English is becoming a universal tongue in order to facilitate contact with individuals from various nations. However, the majority of prior studies in EFL settings suggested that students had strong external motivation—learning the value of English for objectives connected to education and employment (Hayes, 2014; Long, Ming, Chen, 2013).

There was no evidence of a direct link between motivation and learning (Fan & Feng, 2012; Kitjaroonchai, 2012). According to the data, these students' learning may not be improved by curiosity alone (Jang, 2008). Loima and Vibulphol (2016) stated that "acculturated external motivation," also known as peer recognition, and student-teacher interaction were important elements influencing students' motivation and learning in the classroom.

Motivational Factors of Bachelor of Mathematics Pedagogy Taught in English

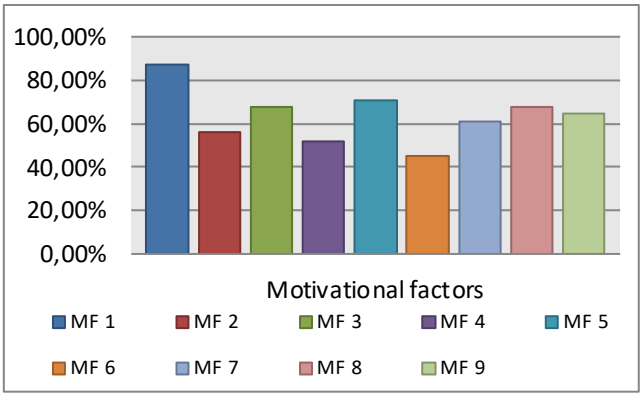

Figure 3. Frequency of motivational factors

Table 3.

Frequency of motivational factors

No.	Motivation factors	Choice	
		Frequency	Percentage
1	Lecturers have: dedication, enthusiasm, high professional qualifications, good pedagogical skills, an attractive and engaging lecture presentation method, and good teacher moral qualities.	27	87.1%
2	Adequate university conditions and modern facilities (reasonable class size, fixed teacher assignment, sufficient equipment for teaching and research).	16	56.1%
3	Learners themselves attain good achievements/ results in the learning process, study effectively and achieve self-satisfaction, thereby improving their self-confidence.	21	67.7%
4	Learners (especially) enjoy/are passionate about Math and/in English.	16	51.6%
5	Learners have intrinsic motivation (personal interests, ...) to learn Math in English; the motivation to learn Math in English comes from the learners' needs and desires/aspirations.	22	71%
6	English is the only second language that learners acquire.	14	45.2%
7	Learners who are interested/passionate or have the desire to learn and integrate with the community of English-speaking countries.	19	61.3%
8	The members of the class study actively and enthusiastically, have an equal level of learning and have a good spirit of cooperation.	21	67.7%
9	The content of Math in English knowledge is of moderate difficulty, practical, and easy to absorb and apply; the curriculum is designed in a balanced manner, ensuring the fit; the textbook has a clear layout, the knowledge is presented scientifically, easy to understand, and attractive.	20	64.5%
Sum		31	

From Table 3, it could be seen that the factors about lecturers was the group that motivated the most students with the choice of 27/31 students (accounting for 87.1%). This data suggests that lecturers like Loima & Vibulphol (2016), are a potent external source of incentive for students. According to earlier research, positive teacher-student interaction is one of the fundamental motivating factors needed in a classroom (Al Shlowiy, 2014; De Witte & Rogget, 2013; Urhane, 2015). The data also showed that 71% of students were motivated when they voluntarily studied Math in English, making the group of factors related to the voluntary nature of learning the second most popular choice. About two-thirds of the students cited their self-confidence and the attitude of their classmates as motivating factors. Fourteen students (over 45%) feel motivated because they only had to learn a second language, English. The frequency of factors

such as conditions of the faculty and university, the students' positive attitude towards the subject and the English-using community as well as the learning materials used, were not significantly different. Those groups of factors affected about 50% - 65% of students. From that, it could be concluded that the lecturers, the voluntary nature of the subject, the confidence and the positive attitude of the classmates contribute to the formation of motivation in the learners.

Among nine factors, the factors related to lecturers greatly influenced the formation of learning motivation in students. The English lecturers had solid expertise from the Faculty of English, the experienced Math lecturers who have studied and worked both domestically and internationally from the Faculty of Mathematics, along with Vietnamese visiting lecturers and foreigners, have played an essential role in improving the professional quality of teaching and learning Mathematics in English at the Faculty of Mathematics. Students had valuable opportunities to gain in-depth language and subject content knowledge from experts and were inspired by their teachers' professional commitment and enthusiasm. In addition, with professional teaching methods and engaging lectures, the lecturers in charge of the course strived to create a supportive learning environment that encouraged the ability to self-study and research as well as equip learners with the necessary qualities of a science teacher in English. In short, educators have done a great job of supporting students and having a certain impact on learners.

The research results also showed that the voluntary nature of learning Math in English was a source of motivation for many students. This conclusion was supported by the fact that students had average intrinsic motivation. Students learned to satisfy themselves, and for them, learning Math in English was not merely a compulsory subject that the university required them to learn. This spirit should be nurtured and promoted by propagandizing the importance and inevitability of these integrated subjects in particular and the method of teaching science in English in general to more students.

It is a fact that if students feel confident, they will be encouraged to study Math in English. The results of research on types of motivation also supported this statement. Successful experiences or achievements often created high self-confidence, and the confidence then motivated the students to learn. To maintain learner confidence, educators should design tasks that are fit and of moderate difficulty while clearly stating learning goals (William, 2011). In addition, students need to be able to express their personal views and understanding freely in the learning and research process.

The positive attitude of classmates was also a motivating factor for two-thirds of the study's participants. Most of the students were qualified and capable, eager to learn and actively participated in classroom activities. This has created active cooperation as well as competition among learners. Active cooperation between learners will contribute to improved learning outcomes in the way that students can also learn from their classmates and seek motivation from them. Teachers need to pay attention to the formation of a learning environment where individuals have the opportunity to demonstrate their own abilities and form a collective spirit. Class tasks and activities must be carefully designed to ensure that students learn and utilize them to share experiences and knowledge. Class assignments also need to be diversified and

flexible. The remaining factors only motivated about 50% of the students, so they need to receive proper attention to improve efficiency.

English Learning Habits of Bachelor of Mathematics Pedagogy Taught in English

When asked about the amount of time spent studying English after class, 6/20 students answered that they did not spend time studying English on their own. In other words, those students relied solely on 420 lessons at university to raise their English level from A1/A2/B1 to B2 (according to the CEFR). 10 students said they spent 15-60 minutes studying English at home daily. Only 1 student spent 2-3 hours studying English on a daily basis. The remaining 3 students spent 2-3 hours a week on self-studying English, especially when the exam was coming up.

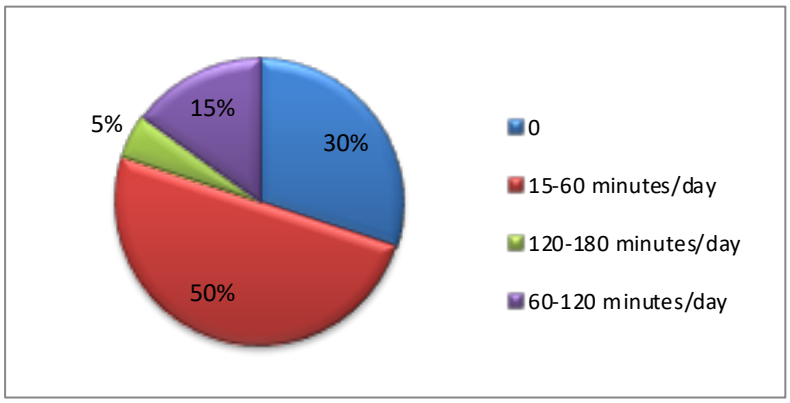

Figure 4. Time to self-study English outside of class by Bachelor of Mathematics Pedagogy taught in English

The above results showed that educators still have a lot of work to deal with the students who did not spend time studying English at home and only rely on the number of classes at university to improve their English ability from A1/A2/B1 (CEFR) to B2. The above time period was basically not enough to reach the output target. For students who have spent time on self-study, being guided by the lecturers with effective and appropriate self-study methods will contribute to maximizing learning results.

Recommendations and Suggestions

From the results discussed above, the study proposes four recommendations to enhance the effectiveness of similar courses in the future:

1. Learners need to clearly understand career prospects and job opportunities while they are still in school and need to be given more opportunities to practice teaching Mathematics in English in a real educational environment. Learners' learning motivation really needs proper attention and constant nurturing; therefore, educators should pay more attention to providing students with up-to-date information and knowledge about subject content value and the importance of integrated teaching methods.

2. It is necessary to develop a set of national competency standards for teachers of science subjects in English with reference to documents from Europe and developed countries to have

a reasonable curriculum framework, testing and assessment standards, and output capacity more synchronously and accurately.

3. It is vital to enhance and supplement modules/lessons on language of instruction and language used in the classroom.

4. The institution should increase and supplement the number of credit hours of intensive English courses to a minimum of 500 hours/600 periods (40 credits). The number of credit hours should be appropriately distributed between the Intensive English courses as well as the Mathematical English courses based on the student's entry level of English competence.

Conclusion

From the above research results, it is plausible to conclude that students with a bachelor's degree in Mathematics pedagogy taught in English had an average level of learning motivation. This contributed to affirming that teaching science subjects in English was somewhat essential and influenced students' learning and career orientation (although this influence was not extensive). The obtained results demonstrated that the research participants were motivated by both intrinsic and extrinsic motivations, placing great demands on the formation and maintenance of supportive and nurturing learning environments and learning motivation.

In this course, students felt motivated to learn thanks to the impact of the factors about lecturers, the voluntary nature of subject learning, high self-confidence, and the positive attitudes of classmates. The learning materials, the university’s facility, together with students' positive attitudes towards Math in English, learner autonomy, and the language community also created motivation for learners to a certain extent.

Another conclusion that could be drawn from the study was that not all students spent time self-studying English after class. As analyzed in the study, 350 hours of general and specialized English at the university were not enough to assist all students in achieving the English output standard (CEFR B2), which required them to be autonomous learners outside the classroom to achieve the learning outcome of English proficiency. Therefore, students need to spend more time learning English and accessing the study materials themselves, and lecturers also need to make more efforts to improve this situation.

Through the discussion, four recommendations were proposed to improve the effectiveness of the course, namely adding more credit hours to the intensive English program, increasing the lessons on the language of instruction in English, providing students with up-to-date materials on methods as well as developing a national competency standard for teachers of science subjects in English.

In order to overcome the limitations of this study, the author hopes to conduct further studies in the future with more participants, focusing on analysis and comparison between students' learning motivation, learner autonomy and their learning outcomes.

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