

THE LINKS BETWEEN STUDENTS' ONLINE LEARNING PATTERNS AND THE ACADEMIC ACHIEVEMENTS IN THE ENGLISH FLIPPED CLASSROOM AT HANOI UNIVERSITY OF INDUSTRY

MỐI QUAN HỆ GIỮA CÁCH HỌC TRỰC TUYẾN CỦA SINH VIÊN VÀ KẾT QUẢ HỌC TẬP Ở NHỮNG LỚP HỌC TIẾNG ANH ĐẢO NGƯỢC TẠI TRƯỜNG ĐẠI HỌC CÔNG NGHIỆP HÀ NỘI

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ABSTRACT

This paper reports non-English major students' online learning patterns and the relationships between the online learning patterns and the academic achievements in the English flipped classroom at Hanoi University of Industry (HaUI). The data were collected via the questionnaire delivered to 240 students from Faculty of Information and Technology (FIT) who took six different courses in the English for Information and Technology program in the academic year 2023 - 2024. Some major findings were drawn up in this study. Firstly, a strong link was indicated between the punctual submission of online tasks and higher academic performance. Students who completed assignments before the deadline consistently achieved better grades, highlighting the critical role of time management in educational success. Secondly, the frequent use of AI applications and educational websites emerged as a significant factor contributing to improved academic outcomes. This suggests that integrating technology into learning processes can enhance student engagement and comprehension. Thirdly, an increase in time allocated to after-class tasks correlates positively with academic performance. This reinforces the notion that sufficient time investment in learning activities is essential for mastering content and achieving better results.

Keywords: *Flipped classroom; academic achievement; online learning patterns.*

TÓM TẮT

Nghiên cứu này tìm hiểu về các cách học trực tuyến của sinh viên không chuyên tiếng Anh và mối quan hệ giữa các cách học trực tuyến và kết quả học tập trong các lớp học tiếng Anh đảo ngược tại Trường Đại học Công nghiệp Hà Nội (HaUI). Dữ liệu được thu thập thông qua bảng câu hỏi được gửi đến 240 sinh viên thuộc Khoa Công nghệ Thông tin (FIT) từ sáu học phần khác nhau trong chương trình Tiếng Anh Công nghệ Thông tin trong năm học 2023 - 2024. Một số phát hiện chính đã được rút ra từ nghiên cứu này. Thứ nhất, kết quả cho thấy có mối liên hệ chặt chẽ giữa việc nộp bài tập trực tuyến đúng hạn và kết quả học tập cao. Những sinh viên nộp các bài nói/bài viết đúng thời hạn thường đạt điểm cuối kỳ cao hơn. Điều này cho thấy vai trò quan trọng của việc quản lý thời gian đối với sự thành công trong học tập. Thứ hai, việc sử dụng thường xuyên các ứng dụng AI và các trang web giáo dục cũng là một yếu tố quan trọng góp phần vào cải thiện kết quả học tập. Điều này cho thấy, việc ứng dụng công nghệ vào quá trình học tập có thể nâng cao sự tham gia và hiểu biết của sinh viên. Thứ ba, việc dành nhiều thời gian hơn cho việc hoàn thiện các bài nói/bài viết sau giờ học có mối quan hệ tích cực với kết quả học tập. Điều này khẳng định quan điểm rằng việc đầu tư đủ thời gian vào các hoạt động học tập là rất cần thiết để nắm vững kiến thức và đạt được kết quả tốt hơn.

Từ khóa: *Lớp học đảo ngược, kết quả học tập, cách học trực tuyến.*

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1. INTRODUCTION

As affirmed by Moore [1], learner-content interaction is a “defining characteristic of education”, and “without it, there cannot be education”. Self-study plays a crucial role in education, and even more important in higher education environments where students are adult learners and self-oriented and self-responsible for their own study. Given its importance, many teaching methods have been developed to facilitate more self-study opportunities for learners. With the advancements in Information and Communication Technology (ICT), traditional face-to-face teaching was mixed with online learning to create blended learning - a teaching method that enables a greater role of learners.

The flipped classroom is one of the blended learning models [2] in which students learn basic content before class in the form of instructional videos, recorded lectures, readings, etc. Then, instructors use class time to apply the material through complex problem-solving, deeper conceptual exploration, and peer interaction [3]. Accordingly, self-study in the pre-class stage provides students with a foundational understanding of the unit before coming to the class, making it a critical component of the flipped classroom. Therefore, examining issues related to students' online learning experiences are worth considering. Much effort has been given to explore learning behaviour patterns and predict learning performances based on interaction data, but far too little attention has been paid to analyzing students' online learning behaviours via students' perspectives. Therefore, the purpose of this study was to examine students' online learning patterns and how students' in-fact online learning patterns impact their academic achievements. The following research questions were considered:

- (1) How do students perform online tasks in fact?
- (2) What are the links between students' de facto online learning patterns and their academic results?

2. THEORETICAL FRAMEWORK

2.1. Flipped Classroom

The idea of the flipped classroom model was first introduced in the 1990s by Dr. Wesley Baker, a professor at Cedarville University in Ohio. However, this teaching model has become popular following its application in the chemistry class of Jonathan Bergmann and Aaron Sams, the two chemistry teachers at Woodland Park High

School in 2007 [3]. Bergmann and Sams [4] defined flipped classroom in which the learning activities which are traditionally done in class are switched to be done at home, and conversely the learning activities which are traditionally done as homework are switched to be completed in class.

This teaching method is implemented in various models but there are four main models. Firstly, according to Bergmann and Sams [4], in the “Traditional” Flipped model, students watch the lecture videos the night before coming to class. In 2008, they evolved their traditional flipped model into the Flipped-Mastery model in which students are given an outline of all the units, along with objectives, assignments and a variety of resources (videos, texts, worksheets). The third model of flipped classroom is the “Partial” Flipped model in which students are allowed to watch the lecture videos out of class at their discretion [5]. The fourth model is the Holistic Flipped Classroom [6]. In this model, students are required to preview corresponding lecture videos and other preparatory materials at their own pace on the platform in the Holistic Flipped Classroom before every synchronous class.

2.2. Academic Achievement

The definitions of “*academic achievement*” vary among scholars and researchers [7]. Steinmayr [11] developed a general definition of academic achievement that refers to performance outcomes indicating the extent to which a person has accomplished specific goals. Astin [8] believed that academic achievement includes the outcomes in terms of cognition, psychology, and behaviour while Bloom [9] defined academic achievement as an inclusion of knowledge, values and attitudes, and skills or appropriate behaviors. In a narrow sense, academic achievement is defined as the measured performance of students through examinations, such as final exam results, at a certain study stage [10]. Students' academic achievements in this study are measured via their final exam scores.

2.3. Online Learning Patterns

The term learning patterns refers broadly to students' habitual ways of learning described in terms of how students cognitively process information and the metacognitive, motivational and affective strategies they use [12]. Vermunt and Donche [13] believed that a learning pattern refers to a coherent whole of learning

activities that learners usually employ, their beliefs about learning and their learning motivation, a whole that is characteristic of them in a certain period of time. Based on these definitions, online learning patterns could be understood as the ways that students use as habits when learning in online environments.

According to Lonka et al. [14], Richardson [15], and Vermunt [16], there are four different qualitative patterns in the way students learn in higher education: *reproduction-directed learning*, *meaning-directed learning*, *application-directed learning*, and *undirected learning*. For the *reproduction-directed learning pattern*, students try to remember the learning contents to be able to reproduce them on a test. They memorize the learning materials and go through the study materials in a sequential way. Their motive for learning is to pass the test or to test their capabilities. They view learning mainly as the intake of knowledge from an external source to their own head, keeping it as closely as possible to the original. For the *meaning-directed learning pattern*, students try to understand the meaning of what they learn, try to discover relations between separate facts or views, and structure the learning material into a larger whole. In other words, they learn in a self-regulated way, not limiting themselves to the prescribed materials and are motivated through personal interest for the topics of their studies. For the *application-directed learning pattern*, students try to discover relations between what they learn and the world outside. They try to find examples of what they study and think about how they would be able to apply what they learn in practice. Both more self-regulated and externally regulated variants of this pattern exist. Vocational motives often underlie this pattern: students want to prepare themselves for a profession or they want to become better in their current job. For the *undirected learning pattern*, this pattern can often be seen with students who are in transition from one form of schooling to another, for example from secondary to higher education, from undergraduate to graduate studies, or students coming from another country with different pedagogical practices. They try to adopt the approach they were used to previously, realize that this approach is not adaptive in the new circumstances, but do not know well how to learn in a better way. In this study, we examine the first type of learning pattern - *reproduction-directed learning*.

3. METHODS

3.1. Context

The study was carried out at HaUI - a public university in Vietnam. HaUI is one of the leading application-oriented universities in Vietnam with multiple disciplines, modes of education and education levels. English is one of the compulsory subjects for non-English major students. In other words, completion of the six English courses is one of the prerequisites for graduation. Since 2016, the university has implemented blended English courses for non-English major students. In particular, the English classes are given on the flipped model of blended learning in which students study learning materials online before every face-to-face session and practice speaking skills at face-to-face sessions. After each face-to-face session, students do a speaking/writing assignment by making a video/writing a paragraph related to the unit's topic and uploading it to the Learning Management System - EOP.

3.2. Participants

The participants in the current study were 240 FIT students who took six different courses in the English for Information and Technology program at Hanoi University of Industry. The students in the English blended course participate in 35 online self-study hours at home and 40 in-class study hours with the teacher.

3.3. Research methods

We conducted quantitative research. The analysis of students' online learning patterns and the relationship between these patterns and their academic achievements was made based on statistical data.

3.4. Data collection instruments

The data were gathered from participants via self-reported Google Forms questionnaires, and the questionnaires were delivered to students via Zalo groups. The questionnaires used in this study include two parts. The first part questions respondents' personal information while the second part contains questions about their online learning patterns and academic achievements in fact. Three variables were identified and selected for analysis of students' online learning patterns and the academic achievements in the current study. The selected variables were as follows:

1. Task completion attempts: This variable considers the extent to which a student attempts to complete

online tasks. In particular, it was identified by grouping the questions concerning whether students complete before-class tasks, after-class tasks, Unit Tests before the deadline or not, and how long students complete online tasks before or after the deadline in the questionnaire.

2. The supporting resources: This variable examines how students use supporting resources during the online learning process. In particular, it was identified by grouping the questions concerning whether students study online with their peers or not, how often they use AI applications and websites during the online learning process, and when they use referential answers to the question in tasks.

3. Task completion time: This variable examines how much time students spent performing online tasks. In particular, it was identified by grouping the questions concerning how long it takes students to complete a before-class task (less than 1 hour, 1 to 2 hours, over 2 hours), a speaking task (within 15 minutes, 15-30 minutes, 30 minutes to 1 hour), an after-class writing task (within 30 minutes, 30 minutes to 1 hour, over 1 hour).

These three variables are considered by academic achievement. In particular, the academic achievement in this study is measured via students' final exam scores. There are three progress tests during the course and an exam at the end of the course. The scores of the final exam were chosen to assess students' academic achievement because the tests of the final exam measure all the course learning outcomes while each progress test measures only one course learning outcome. The final exam scores are classified according to the grading system of the university in which the letter grades, A (Very Good), B (Good), C (Average), D (Below-Average), and F (Fail) include the score ranges of 8.5-10.0, 7.0-8.4, 5.5-6.9, 4.0-5.4, 0-3.9 respectively.

Based on students' personal information (e.g. student code, English class code) provided via questionnaires, the data on students' online learning patterns and the academic achievements were accessed and validated by being collated and compared with the EOP reports on students' online learning activities on EOP websites for the lecturer (<https://admin.eop.edu.vn/>) and the final exam scores on the website of HaUI for the lecturer (<https://gv.haui.edu.vn/>).

The data were analysed by Google Spreadsheets and the Microsoft Excel software. In particular, the charts and

tables illustrating the statistics on the options of each question in the questionnaires were produced by Google Form. At the next step, the statistics were transferred to the Microsoft Excel software. The numbers of students with different online learning patterns were calculated and classified according to the score ranges in the grading system mentioned above. These figures were converted to percentage. Thereby, the percentages of students by score level in each pattern were compared to one another and accordingly, the links between their final exam scores and online learning patterns were identified.

4. RESULTS AND DISCUSSION

4.1. Results

Table 1. Students' Scores and the Task Completion Attempts

Duty-Attempt Pattern		Student Grade		Percentage				
		A	B	C	D	F		
Before-Class Tasks	After the deadline	0%	0%	50%	50%	0%		
	Before deadline	Just in time	0.0%	9.7%	35.5%	41.9%	12.9%	
		Before 1 day	1.3%	13.8%	27.5%	48.8%	8.8%	
		Before more than 2 days	2.9%	5.9%	41.2%	44.1%	5.9%	
After-Class Tasks	On the day students finish the unit in the class	3.1%	9.2%	30.8%	43.1%	13.8%		
	Within 1 week after students learn the unit in the class	0.0%	13.2%	36.8%	44.1%	5.9%		
	At the end of the course	0.0%	0.0%	40.0%	60.0%	0.0%		
Unit Tests	Before deadline	0.0%	13.0%	32.6%	47.8%	6.5%		
	At the end of the course	0.0%	0.0%	45.5%	36.4%	18.2%		

Table 1 provides information about how students meet the deadline for before-class tasks, after-class tasks, and Unit Tests based on the levels of the final score.

None of the students receiving A or B grade in the final exam completed of before-class tasks after the

deadline, and C students and D students accounts for the half each. 9.7% of the students who completed before-class tasks just in time are B students while the number for D students is the highest (41.9%). The figures for C students and F students are 35.5% and 12.9%. The completion of before-class tasks one day before the deadline showed a slightly better distribution, with 1.3% of the students achieving A marks, 13.8% of achieving B marks, and 48.8% achieving D marks. For the completion of the before-class tasks before more than two days, 2.9% receiving A marks, 5.9% receiving B marks, and a notable 41.2% achieving C receiving, alongside 44.1% receiving D marks.

For the completion of the after-class tasks, the proportions of A, B, C, D, and F students submitted on the day when the unit is finished are 3.1%, 9.2%, 30.8%, 43.1% and 13.8% respectively. None of the A students submitted the after-class tasks within one week after learning the unit while the number of D students makes up for 44.1%. The figures for B, C, F students are 13.2%, 36.8%, and 5.9% respectively. Dissimilar to the proportion distributions for the completion of the after-class tasks on the day when the unit is finished and within one week after learning the unit, the percentages of students who submitted the after-class task at the end of the course are only recorded among C students (40%) and D students (60%).

As far as the completion of the Unit Tests before the deadline is concerned, no students achieved A marks at the final exam, while 47.8% of the students received D marks. The proportions of the students who completed the Unit Tests at the end of the course showed D marks a different distribution: 45.5% received C marks, 36.4% D marks, and 18.2% F marks, with no students earning A or B marks.

Table 2. Students' Scores and the Supporting Resources

Supporting Resources \ Student Grade		Percentage				
		A	B	C	D	F
Studying with Peers	Alone	1.9%	13.1%	33.6%	42.1%	9.3%
	In pair	0.0%	0.0%	50.0%	50.0%	0.0%
	In group	0.0%	11.1%	11.1%	66.7%	11.1%
Using AI applications and websites	Usually	2.2%	6.5%	28.3%	47.8%	15.2%
	Sometimes	1.1%	12.2%	33.3%	46.7%	6.7%
	Never	0.0%	22.2%	44.4%	33.3%	0.0%

Answers available	Refer to the answers before completing the questions	3.0%	12.1%	24.2%	42.4%	18.2%
	Refer to the answers after the first completion of the task	0.0%	6.5%	34.8%	52.2%	6.5%
	Refer to the answers until students cannot find the answers	1.5%	13.6%	34.8%	43.9%	6.1%

Table 2 illustrates the percentages of students classified based on the degree of utilizing supporting resources and levels of final scores.

For the students who study online alone, A, B, C, D, and F students account for 1.9%, 13.1%, 33.6%, 42.1%, and 9.3%. In contrast, none of the students working in pairs achieved A or B scores, and C and D students take up 50% each. Students who studied in groups had a varied distribution: 11.1% earned B marks, 11.1% C marks, and a significant 66.7% received D marks, while 11.1% got F marks.

The proportions of the students who use AI applications and websites usually and achieve A, B, C, D, and F marks are 2.2%, 6.5%, 28.3%, 47.8%, and 15.2% respectively. For the students who sometimes use AI applications and websites, 1.1%, 12.2%, 33.3%, and 46.7%, 6.7% are the proportions for the A, B, C, D and F students. Conversely, students who never used software or websites showed a notable pattern, with no A grades, 22.2% receiving B marks, 44.4% C marks, and 33.3% D marks, while none failed.

In relation to the students who tend to refer to answers before completing the questions, 3.0% earned A marks, 12.1% B marks, 24.2% C marks, 42.4% D marks, and 18.2% F marks. For those who tend to refer to answers after the first completion of the task, no students received A marks, and grades skewed lower, with 6.5% earning B marks, 34.8% C marks, and 52.2% D marks, alongside 6.5% failing. Lastly, students who tended to refer to answers until they could not find the answers had 1.5% achieving A marks, 13.6% B marks, 34.8% C marks, 43.9% D marks, and 6.1% F marks.

Table 3. Students' Scores and the Task Completion Time

Task- Completion time		Student Grade				
		Percentage				
		A	B	C	D	F
Before-Class Tasks	Less than 1 hour	0.0%	6.7%	46.7%	36.7%	10.0%
	1 to 2 hours	1.1%	14.1%	28.3%	46.7%	9.8%
	Over 2 hours	4.3%	4.3%	30.4%	56.5%	4.3%
EOP-Uploaded Speaking Tasks	Within 15 minutes	0.0%	15.6%	31.3%	43.8%	9.4%
	15 minutes to 30 minutes	1.3%	7.6%	31.6%	48.1%	11.4%
	30 minutes to 1 hour	2.9%	14.7%	35.3%	44.1%	2.9%
EOP-Uploaded Writing Tasks	Within 30 minutes	1.6%	12.5%	29.7%	46.9%	9.4%
	30 minutes to 1 hour	0.0%	8.7%	33.3%	47.8%	10.1%
	Over 1 hour	8.3%	16.7%	41.7%	33.3%	0.0%

Table 3 presents data on the proportions of the students classified by their time duration of online study and final scores.

For the students who tend to complete tasks in less than 1 hour, no students achieved A marks, while 6.7% earned B marks, 46.7% C marks, 36.7% D marks, and 10.0% F marks. When students spent 1 to 2 hours on these tasks, 1.1% received A marks, 14.1% B marks, and 28.3% C marks, with 46.7% earning D marks and 9.8% F marks. In contrast, for the students who tend to complete tasks within over 2 hours, the results showed slight improvement at the higher end, with 4.3% achieving A marks, 4.3% B marks, and 30.4% C marks, while a significant 56.5% received D marks and 4.3% F marks.

Regarding the students who tend to complete tasks within 15 minutes, no students achieved A marks, while 15.6% earned B marks, 31.3% C marks, 43.8% D marks, and 9.4% F marks, indicating a predominance of lower grades. When students took 15 to 30 minutes to complete the tasks, 1.3% received A marks, 7.6% B marks, and 31.6% C marks, with a higher proportion, 48.1%, earning D marks and 11.4% receiving F marks. For tasks completed in 30 minutes to 1 hour, there was a slight improvement, with 2.9% achieving A marks, 14.7% B marks, and 35.3% C marks, while 44.1% received D marks and only 2.9% failed.

When it comes to the students who tend to complete tasks within 30 minutes, 1.6% of students achieved A marks, 12.5% B marks, 29.7% C marks, 46.9% D marks, and 9.4% F marks, indicating a tendency towards lower performance. When students took 30 minutes to 1 hour, no students received A marks, while 8.7% earned B marks, 33.3% C marks, and 47.8% D marks, with 10.1% failing. However, for tasks completed in over 1 hour, there was a notable improvement, with 8.3% earning A marks, 16.7% B marks, and 41.7% C marks, while only 33.3% received D marks and no students failed.

4.2. Findings and discussions

A number of findings could be drawn from the results above.

In terms of Task Completion Attempts, the data indicated that students who completed before-class tasks after the deadline predominantly received D and C grades, suggesting a strong correlation between timely submissions and academic performance. Notably, no students achieving A or B grades submitted their tasks late, highlighting the importance of meeting deadlines. Conversely, after-class tasks submitted on the same day showed a slightly better distribution of grades, with a modest percentage of students achieving A and B marks. However, the trend persists that students performing poorly tended to submit their work later. This pattern suggests that procrastination may hinder students' ability to achieve higher grades, as evident from the significant number of students receiving D and F grades across various submission timelines.

With regard to the Use of Supporting Resources, students working in pairs or groups showed a distinct pattern; no students in pairs received high grades, and a considerable majority received D or F marks. This suggests that collaborative learning environments may not be effectively supporting student learning. Furthermore, the use of AI applications and websites appears to positively influence performance, particularly among those who utilize these resources "usually." However, students who never used these tools generally scored lower, reinforcing the notion that leveraging available educational technologies can enhance academic outcomes.

Concerning Time Management, the time allocated for task completion also significantly affected student grades. Students who completed tasks in less than one

hour consistently received low grades, whereas those who spent over two hours exhibited improved performance. This trend was mirrored in the EOP-uploaded speaking and writing tasks, where longer completion times correlated with higher grades. These findings emphasize the necessity for students to allocate sufficient time for task completion, as hastily completed assignments likely result in inadequate understanding and performance.

In short, the analysis of task completion patterns, resource utilization, and time management reveals critical insights into the factors influencing student performance. It is evident that meeting deadlines, engaging in collaborative learning, effectively using educational resources, and managing time efficiently are pivotal to achieving better academic results. These findings suggest that educators should promote strategies that encourage timely submissions, collaborative work, and the effective use of technology to foster an environment conducive to learning and success. Further research could explore the underlying reasons for these patterns and how targeted interventions might improve student outcomes.

5. CONCLUSION

The study emphasizes the importance of developing effective online learning patterns among students, particularly regarding time management, collaboration, and the use of digital resources. These insights offer a foundation for educators to refine instructional strategies within the flipped classroom model, aiming to foster an environment that supports timely task completion, collaborative learning, and effective use of technology. Future research could further explore these relationships and investigate targeted interventions to enhance student performance and engagement in online learning contexts.

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THÔNG TIN TÁC GIẢ

Phạm Thị Bích Hào, Lê Xuân Huyền, Bạch Ngọc Anh

Trường Ngoại ngữ - Du lịch, Trường Đại học Công nghiệp Hà Nội