

A study of the relationship between learning flow and learning burnout in college online classes

Hee-Joo Im¹, Young Lim Lee^{2*}

¹Professor, School of General Education, Dankook Univ.

²Professor, Dept. of Psychology & Psychotherapy, Dankook Univ.

대학 온라인학습에서 학습몰입과 학습소진의 관계에 관한 연구

임희주¹, 이영림^{2*}

¹단국대학교 자유교양대학 교수, ²단국대학교 심리치료학과 교수

Abstract This study aims to investigate the relationship among the learning flow, perceived effectiveness of online learning and learning burnout in college online classes. A total of 149 college students participated in the study and completed the survey including learning flow, learning burnout and demographic information. The results showed that participants with higher learning flow showed less learning burnout. In addition, the perceived effectiveness of online learning partially mediated the relationship between cognitive learning flow and learning burnout, but did not mediate the relationship between defined learning flow and learning burnout. Since learners with higher cognitive learning flow perceived online learning as more effective, it is necessary to find out how to build learners' cognitive learning flow to decrease learning burnout. The results imply that universities should provide students with administrative support and an appropriate online learning environment.

Key Words : Effectiveness of online learning, Learning flow, Learning burnout, Online classes, College students

요약 본 연구의 목적은 대학 온라인 학습자들의 학습몰입, 온라인 학습의 효과성, 그리고 학습소진간의 관계를 조사하는데 있다. 총 149명의 대학생이 연구에 참여하였고 학습몰입, 학습소진, 그리고 배경질문을 포함한 설문 작성을 완료하였다. 연구의 결과로 학습몰입이 높은 참가자들은 학습소진이 낮았다. 또한, 지각된 온라인 학습의 효과가 인지적 학습몰입과 학습소진의 관계에서는 부분적으로 매개했지만 정의적 학습몰입과 학습소진의 관계에서는 매개효과를 나타내지 않았다. 인지적 학습몰입이 높은 학습자들은 온라인 학습을 보다 효과적이라고 지각했기 때문에, 학습소진을 낮추기 위해서 학습자의 인지적 학습몰입을 높일 수 있는 방법을 찾는 것이 필요하다. 본 연구의 시사점으로, 대학차원에서 학생들에게 행정적 지원과 적절한 온라인 학습 환경을 제공하려는 노력이 뒷받침되어야 하겠다.

주제어 : 온라인학습의 효과성, 학습몰입, 학습소진, 온라인 수업, 대학생

*Corresponding Author : Young Lim Lee(younglee13@dankook.ac.kr)

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1. Introduction

On 31st of December 2019, COVID-19 was first reported, and it has been a major threat worldwide. Throughout the world, the countries facing this pandemic have protected the lives of their citizens. This fact has had a huge impact on the global economy, tourism, health, education, trade, and almost all other sectors of society.

As a result, education in schools, colleges, and universities around the world has changed to online learning. The rapid transition to online classes raised the concerns of the students, instructors, and educators in the field. These burdens or worries resulted in increased anxiety and stress for everyone involved. In particular, students who were required to attend online classes during the outbreak have increased stress and burnout of their studies. Scholars determined that learning burnout affects the learning flow, learning satisfaction, self-efficacy, and academic achievement of online learning[1]. Burnout is defined as “a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed”[2]. Moreover, burnout has three crucial aspects such as a low sense of achievement, depersonalization, and emotional exhaustion[3]. Thus, the term burnout was used not only for the workplace but also for students who were exhausted from learning after the COVID-19 pandemic. In fact, learning burnout for university students is one of the common experiences, and it shows some characteristics: decreasing learning motivation, negative change of students’ affective and cognitive function, inability to control academic stress, reduced physical resources, negative academic experiences, and inappropriate behavior towards school[4-5].

While some level of stress can stimulate a learner’s physical and mental functioning and improve learning performance[6], excessive stress can lead to negative consequences such as

anxiety, depression and health problems, and poor learning outcomes[7,8]. In particular, Elmer, Mepham, and Stadtfeld’s quantitative study found that lockdown and social distancing measures negatively influenced the social integration of Swiss college students leading to feelings of isolation and stress. Additionally, this study determined that stress, anxiety, loneliness, and depressive symptoms were increased due to a decrease in students’ social networks (e.g., pleasant interaction, friendship, social support, co-studying)[9].

Within Korea, universities utilized learning management systems (LMS) for distance learning to help students’ participation in classes. The usage of these systems allowed university students to be actively involved in online classes and activities, but there was a lack of interaction between students and their instructors or their peers. Moreover, online classes that had insufficient communication between participants could lead to increased stress for students and even affect their learning flow. Learning flow can be defined as a psychological process in which a learner who wants to achieve a learning goal continuously interacts with the surrounding learning environment, learning process, and learning activities[10]. It should be noted that prior research related to students’ learning flow has been conducted for both online and offline learning.

The research by Joo, Lim, and Kim examined the determinants of learning flow and achievement in corporate e-learning. The result revealed that e-learning’s self-efficacy, intrinsic value, and perceived usefulness and ease of use were important variables predicting learning flow, while intrinsic value, test anxiety, and perceived usefulness and ease of use were crucial predictors of achievement[11].

Meanwhile, Park set students’ self-regulation ability and learning flow in online programming classes as variables that influence learning

participation and teaching presence while also analyzing the predictive power. The result of this study showed that both self-regulation ability and learning flow were predictors of learning participation and teaching presence, and learning flow was found to play a mediating role between self-regulation ability, learning participation, and teaching presence. Furthermore, this research implied educators need to consider self-regulation ability and learning flow when they designed online programming classes[12].

Next, studies of the relationship between burnout and learning flow also need to be examined. Park and Kang examined the relationship among learning flow, subjective well-being, and academic burnout of 596 university students. It showed that students' learning flow and academic burnout had a significant correlation with subjective well-being. Additionally, it was found that subjective well-being partially mediated the relationship between learning flow and academic burnout for students[13]. While another previous study identified the relation among achievement emotions, learning flow, and academic burnout of pre-service teachers in Korea. The results highlighted that learning-related emotions positively influence learning flow. However, it was also determined that class-related emotions, learning-related emotions, and test emotions showed a negative influence on academic burnout[14].

Meanwhile, Joo, Chung, and Lim investigated that the prediction of academic self-efficacy, learning flow, academic stress, and emotional exhaustion on course satisfaction of cyber university students. The results showed that academic self-efficacy, learning flow, academic stress, and emotional exhaustion significantly predicted students' course satisfaction. According to these results, effective methods and strategies for building a cyber-educational environment in which students can improve their academic

self-efficacy and learning flow and reduce academic stress and emotional fatigue should be considered[15]. Also, S. M. Hong, Kim and Bae[16] stated that health major students' academic burnout in TOEIC test will be decreased by increasing self esteem, self competency and self efficacy.

In general, many studies have focused on students' performance, motivation, learning anxiety, and other issues. However, only a few research have investigated learning burnout. However, since the outbreak of COVID-19 has led to more virtual courses, it is important for educators to examine the students' learning burnout from continuous online education. Therefore, the purpose of the study was to identify the relationship among the perceived effectiveness of online learning, learning flow, and learning burnout of online learners.

2. Method

2.1 Participants

Participants were 149 students of D university located in Cheonan of Chungnam province. 40 male and 109 female students participated in this study and their age ranged from 18 to 26. Due to COVID 19, most classes were conducted online except classes with required practice in the second semester of 2020. Students who took online classes voluntarily participated in this study at the end of semester. As students who took various classes, recorded lectures and real time online lectures were mixed depending on lecturers. Since the survey of this study was conducted online, all participants were asked to complete the survey if they agreed to participate in this study.

2.2 Measurements

2.2.1 Learning burnout

To measure college students' learning burnout,

we used the Maslach Burnout Inventory for Korean students modified by Shin, Puig, Lee, Lee and Lee[17]. Schaufeli, Salanova, González-Romá and Bakker developed MBI-SS(Maslach Burnout Inventory-Student Survey) to measure students' burnout by modifying MBI-GS(Maslach Burnout Inventory-General Survey)[18]. Shin et al. modified and validated MBI-SS to be suitable for Korean students[17]. This scale constitutes five items of emotional exhaustion, four items of cynicism, and six items of academic efficacy. Since our purpose was to measure overall burnout of students while learning online, we computed the total score by combining all items of each component. Participants were asked to respond to each item ranging from 1(strongly disagree) to 5(strongly agree) and a higher total score of responses indicated higher learning burnout. To establish the internal reliability of the 15-item scale Cronbach's alpha was used and the reliability coefficient was .918.

2.2.2 Learning flow

We used the learning flow scale for adults which Kim, Tack and Lee developed to be appropriate to learning situation based on the concept of flow state described by Csikszentmihályi[20]. Csikszentmihályi developed flow questionnaire to measure the flow state of athletes based on nine components of the flow concept[19]. The flow questionnaire has been modified and widely used across a variety of research fields. The learning flow scale developed by Kim et al. is composed of two dimensions, cognitive and defined learning flow. The cognitive flow is composed of five sub-components, challenge-skill balance, clarity of goals, immediate and unambiguous feedback, merging of action and awareness and paradox of control. The defined flow is composed of four sub-components, concentration on the task, loss of self-consciousness, transformation of time and autotelic experience[20]. Although the flow scale

of Kim et al. consists of 9 components, we used two dimensions of flow in this study. A total of 29 items of the learning flow scale constitutes 15-items of cognitive flow("My ability is sufficient to fully understand new content.") and 14-items of defined flow("When I study, I am completely focused"). Participants were asked to respond to each item ranging from 1(strongly disagree) to 5(strongly agree) and a higher total score of responses indicated higher learning flow. To establish the internal reliability of the 29-item scale Cronbach's alpha was used and the reliability coefficient was .942(cognitive flow: $\alpha=.898$, defined flow: $\alpha=.924$).

2.2.3 Demographic Information

To gather demographic information of participants, the questionnaire included their gender, school year, age and major. For the purposes of the study, we also asked participants how much they thought that online learning is effective from 1(very ineffective) to 5(very effective).

2.3 The study model and statistics

The purpose of the study was to investigate whether the perceived effectiveness of online learning would mediate the relationship between learning flow and learning burnout. The study model is presented in Figure 1. To test the multiple mediation effect, we performed General Linear Model (GLM) mediation model by using Medmode module of Jamovi 1.2.27 program. We also used Jamovi 1.2.27 for other statistical analyses in this study.

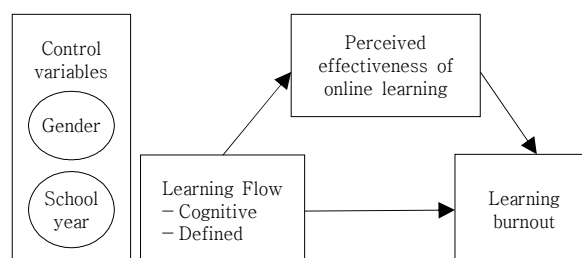


Fig. 1. The study model

3. Results

3.1 Descriptive Analysis

Descriptive findings of the research variables are presented in Table 1. Among a total of 149 students, 40(26.8%) male and 109(73.2%) female students participated in this study. There were 33(22.1%) first year, 68(45.6%) second year, 20(13.4%) third year, and 28(18.8%) fourth year students with an average age of 21.1(SD=1.87). 21(14.1%) students major in humanities and foreign languages, 78(52.3%) students major in social sciences and health sciences, 26(17.4%) students major in sciences and engineering, 20(13.4%) students major in arts and sports, and 4(2.7%) students major in others. When we asked about the perceived effectiveness of online learning, 63(42.3%) students answered that online learning is not effective, whereas 39(26.2%) students answered it is effective.

Table 1. Descriptive findings of variables

Variables	Sub scales	Frequency	M(SD)
Gender	Male	40(26.8%)	
	Female	109(73.2%)	
Age			21.1(1.87)
School year	1	33(22.1%)	
	2	68(45.6%)	
	3	20(13.4%)	
	4	28(18.8%)	
Major	Humanities & Foreign languages	21(14.1%)	
	Social & Health sciences	78(52.3%)	
	Sciences & Engineering	26(17.4%)	
	Arts & Sports	20(13.4%)	
	Others	4(2.7%)	
Perceived effectiveness of online learning*	1	17(11.4%)	
	2	46(30.9%)	
	3	47(31.5%)	
	4	25(16.8%)	
	5	14(9.4%)	

* 1: Very ineffective, 2: Ineffective, 3: Average, 4: Effective, 5: Very effective

3.2 Bivariate Analyses

Bivariate and descriptive analyses of the research variables are shown in Table 2. To perform Pearson's correlation, gender was transformed to a dummy variable(male=1, female=0). Learning burnout was significantly correlated with gender ($r=-0.28$, $p<.001$) and school year ($r=-0.17$, $p=.043$). Female students showed more learning burnout than male students and as the school year was lower, learning burnout was higher. Moreover, learning burnout was significantly correlated with cognitive learning flow ($r=-0.6$, $p<.001$), defined learning flow ($r=-0.4$, $p<.001$), and the perceived effectiveness of online learning ($r=-0.64$, $p<.001$). That is, students with lower learning flow and those who perceived online learning to be ineffective showed more learning burnout. Although two types of learning flow were highly correlated with each other ($r=0.67$, $p<.001$), the perceived effectiveness of online learning was significantly correlated with cognitive learning flow ($r=0.25$, $p=.002$) but not with defined learning flow ($r=0.12$, $p=.14$). Since the skewness of research variables was lower than 10 and the kurtosis of those was lower than 3, the distribution of each variable was shown normal.

Table 2. Pearson's correlation coefficients on research variables and descriptive analysis

	1	2	3	4	5	6
1	1					
2	.22**	1				
3	-.28***	-.17*	1			
4	.13	.06	-.6***	1		
5	.06	-.02	-.4***	.67***	1	
6	.14	.002	-.64***	.25**	.12	1
Mean	.27	2.23	43.4	48.8	36.5	2.82
SD	.45	.95	12.4	9.36	10.3	1.13
Skewness	1.06	.48	-.12	-5.15e-4	.44	.28
Kurtosis	-.9	-.61	-.17	.92	.58	-.62

* $p<.05$, ** $p<.01$, *** $p<.001$

1: Gender, 2: School year, 3: Learning burnout, 4: Cognitive learning flow, 5: Defined learning flow, 6: Perceived effectiveness of online learning

3.3 Testing a mediation effect

To determine whether the association between learning flow (cognitive and defined) and learning burnout would be mediated by the perceived effectiveness of online learning, a mediation analysis was performed using the GLM mediation model in Medmod module of Jamovi. As shown in Table 3, it was shown that after controlling gender and school year, cognitive learning flow predicted learning burnout directly ($\beta = -0.44$, $z = -6.29$, $p < .001$) as well as indirectly ($\beta = -0.16$, $z = -2.71$, $p = .007$), whereas defined learning flow did not predict learning burnout either directly or indirectly. That is, the perceived effectiveness of online learning showed a partial mediation effect in the relationship between cognitive learning flow and learning burnout (see Figure 2). We further analyzed sub-components of cognitive learning flow, only challenge-skill balance ($r = .25$, $p = .002$) and immediate and

unambiguous feedback ($r = .33$, $p < .001$) were positively correlated with perceived effectiveness of online learning. Thus, students who believe their ability to learn and challenge more and those who know how well they learn perceived online learning to be more effective.

4. Discussion and Conclusion

The purpose of the study was to investigate the relationship among the learning flow, perceived effectiveness of online learning and learning burnout of online learners. In particular, we performed a mediation analysis to determine whether the perceived effectiveness of online learning would mediate the relationship between learning flow and learning burnout.

The results showed that the perceived effectiveness of online learning mediated the relationship between cognitive learning flow and learning burnout, but not the relationship between defined learning flow and learning burnout. That is, learners with higher learning flow associated with cognitive factor perceived online learning as more effective, resulting in less learning burnout during online learning.

Based on these findings, there are some implications. First, it is necessary for effective online learning to make students reduce their learning burnout. The degree of students' learning burnout can influence not only academic achievement, but the students' future career after graduation [21, 22]. For effective online teaching and learning, Levin, Waddoups, Levin and Buell [23] highlighted four dimensions such as relevant and challenging assignments, seamless learning environments, adequate and timely feedback, and anytime anywhere teaching and learning. Therefore, these dimensions can promote a higher level of interaction between students and their instructor by providing interactive and effective online learning

Table 3. Mediating effect (DV: Learning burnout)

Type	Effect	<i>B</i>	<i>S.E.</i>	β	<i>z</i>
Indirect effect	Cognitive_F→P_Effect→Burnout	-.21	.08	-.16	-2.71**
	Defined_F→P_Effect→Burnout	.05	.07	.04	.73
Direct effect	Cognitive_F→Burnout	-.58	.09	-.44	-6.29***
	Defined_F→Burnout	-.05	.08	-.04	-.62
Total effect	Cognitive_F→Burnout	-.79	.12	-.6	-6.74***
	Defined_F→Burnout	-.002	.11	-.001	-.01

* $p < .05$, ** $p < .01$, *** $p < .001$

Cognitive_F=Cognitive learning flow, Defined_F=Defined learning flow, P_Effect=Perceived effectiveness of online learning

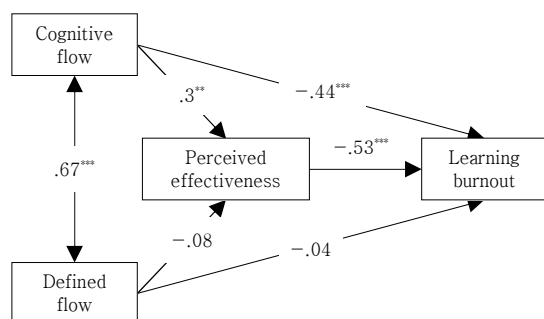


Fig. 2. Statistical diagram of a mediation model

environments. Second, administrators and professors in university need to make efforts to decrease the students' depression such as job stress, academic burnout, and anxiety. Therefore, employment counselling, academic counselling, expansion of resources and various interventions to reduce the students' depression should be supported[24]. To teach students how to manage stress, universities may consider providing courses like emotional management, relaxation training, stress management and stress management training into students' extra curriculum courses[3].

Third, in order to increase students' learning flow, universities need to consider designing differentiated online education programs for each major and grade level. Lower grade students showed low level of learning flow than senior students[25]. Therefore, it is necessary to provide and implement customized guidance, especially for lower grade students.

There are, however, some limitations. First, the perceived effectiveness of online learning was measured by one self-reported question. Thus, validated and reliable questionnaire should be used to measure the effectiveness of online learning in future. Second, there could be other factors that have an effect on learning burnout and thus, further study should investigate the relationships between these other factors and learning burnout of online learners. Third, the role of learning flow on learning burnout was restricted to college level online learning in this study. Any further study, therefore, should compare online with offline learning environment and expand this to other levels of students. Lastly, since the survey was collected from one university in Chungnam province, it is difficult to generalize the results of the study to the entire university students in Korea.

In conclusion, this study found that learning flow has an important role in reducing learning burnout during online learning. In particular,

learners with higher cognitive learning flow perceived online learning as more effective and thus, reduced their learning burnout. This study, therefore, suggests that universities should provide students with an appropriate online learning environment as well as administrative support for more effective online learning.

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임희주(Hee-Joo Im)

[정회원]



- 2005년 8월 : 숙명여자대학교 영어교육학과(영어교육학 석사)
- 2011년 2월 : 중앙대학교 영어교육학과(영어교육학 박사)
- 2011년 9월 ~ 현재 : 단국대학교 자유교양대학 조교수
- 관심분야 : 과업중심 커리큘럼개발, 멀티미디어 영어교육

· E-Mail : heejooim@dankook.ac.kr

이영림(Young Lim Lee)

[정회원]



- 2003년 8월 : Western Kentucky University, Experimental Psychology (석사)
- 2009년 9월 : Indiana University Bloomington, Psychological & Brain Sciences / Cognitive Sciences (박사)
- 2016년 3월 ~ 현재 : 단국대학교 심리치료학과 교수

· 관심분야 : 3D 시각지각, 직접지각, 인지심리

· E-Mail : younglee13@dankook.ac.kr