Design for engagement in blended learning: insights, practices, and challenges

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Chapter 3 Relationship between Perceived Learner Control and Student Engagement in Various Study Activities in a Blended Course in Higher Education[5]

Abstract

In this study, we investigated the relationship between perceived learner control and student engagement in a blended course. Data were collected from 110 second-year bachelor students through weekly questionnaires to gather information about how they perceived their learner control and engagement in various study activities, including reading literature, watching knowledge clips, doing assignments, attending workgroups, and attending lectures. Most students perceived the knowledge clips and workgroups positively because of their clear structure and interactive elements, respectively. In addition, perceived learner control, behavioral engagement, and emotional engagement varied across different activities, whereas cognitive engagement had a similar moderate score across the

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activities. No significant positive relationships were found between students' perceived learner control and engagement. However, negative relationships between perceived learner control and cognitive and behavioral engagement were found for reading literature, and a negative relationship between perceived learner control and cognitive engagement was identified for attending lectures. We conclude that, in general, perceived learner control is not a significant factor for student engagement in blended learning. However, for particular activities, student engagement may increase as their perceived learner control decreases. The results extend the understanding of the relationship between perceived learner and student engagement, which varied at an activity level. Additionally, the findings suggest that teachers could consider enhancing student engagement by assigning different levels of learner control to students based on their needs.

Keywords: Student Engagement, Perceived Learner Control, Blended Learning, Higher Education, Learning Activity

3.1 Introduction

Blended learning, consisting of online and face-to-face classroom tasks, is one of the prevalent course delivery modes in higher education. Improving student engagement has been one of the goals of blended learning in higher education, as it is a vital driver of students' learning, both

on campus and in online environments (Kuo et al., 2021; Reeve & Lee, 2014). Previous studies have shown that student engagement is positively associated with learning outcomes such as academic grades, achievement, persistence, and satisfaction (Barratt & Duran, 2021; Harding, 2012). Promoting student engagement in blended learning might be more complex than in face-to-face learning because, in blended learning, students are provided more control over what they learn with the additional asynchronous online components (Bonk et al., 2005; Graham et al., 2005). Assigning students learning control may improve student engagement because, according to the Self-Determination Theory, the more autonomy students perceive, the more effort they put into their learning process (Ryan & Deci, 2020). However, in pre-class asynchronous tasks, providing learners control over their learning process might lead to less engagement, because learners might not be able to make appropriate decisions about learning content on their own (Williams, 1993). Only a few empirical studies examine the relationship between perceived learner control and student engagement, reporting positive, negative, or non-significant relationships (e.g., Lan & Hew, 2020; Orvis et al., 2009). These inconsistent results present a challenge for teachers on whether and how to implement learner control in blended learning. In this study, we investigated the relationship between perceived learner control and student engagement in

blended learning in higher education, which carries implications for not only other researchers but also teachers and course designers.

3.2 Literature Review

3.2.1 Student Engagement

Student engagement is defined as students' physical and mental investment of their energy in the learning processes (Janosz, 2012), which is a predictor of learning achievement (Harbour et al., 2015). The most widely accepted definition of student engagement distinguishes three components: behavioral, emotional, and cognitive engagement. Behavioral engagement concerns involvement in learning and academic tasks and includes behaviors such as effort, persistence, and attention (Skinner & Belmont, 1993). Emotional engagement refers to positive emotions during task involvement and the absence of negative emotions (Reeve, 2013). Cognitive engagement has been defined as the extent of deep understanding in information processing (Fredricks et al., 2004).

Student engagement is associated with personal and environmental factors in learning, such as student characteristics, teaching, and course design (Chiu, 2021; Hazzam & Wilkins, 2023; Kahu & Nelson, 2018; Liao et al., 2023; Mayer, 2005; Shernoff et al., 2016). Specifically, for a group-based flipped-learning context, Lai (2021) concludes that the students' perceived value of the course was positively associated with students'

behavioral engagement, whereas their perceived task difficulty was negatively associated with their behavioral engagement. In addition, Daud and Ghani (2019) found that the characteristics of lecturers, the quality of information, technical support, and the quality of the online learning system positively affect students' emotional engagement in blended learning. Besides, Smith (2019) identifies the mediating role of emotional engagement in a negative relationship between students' workload and academic attainment in higher education. Lastly, in their research on investigating student engagement in blended learning, Manwaring et al. (2017) conclude that students' perceptions of the challenge of activities are positively related to cognitive engagement. In conclusion, student engagement has the potential to explain the mechanism of how different factors work on successful learning.

Engagement is not only multidimensional, but also highly dynamic, varying, context-dependent, and interactive (Shernoff et al., 2016). This means that student engagement can vary across different learning activities. Task-level engagement refers to the degree to which individuals put effort into a specific task (Newton et al., 2020; Schaufeli & Salanova, 2011). Previous studies have shown the importance of measuring engagement at task level. Specifically, Christian et al. (2011) conclude in their quantitative review that task-level engagement is closely aligned with task-specific

motivation and task performance. In their study of how engagement flows across tasks in a working environment, Newton et al. (2020) conclude that engagement in a preceding task engenders attention residue, which impedes subsequent task engagement and performance. In educational contexts, learners have different tasks or activities throughout a course, and they may apply different levels of engagement to particular tasks (Pöysä et al., 2020). In a quantitative study, Shernoff et al. (2003) found that students displayed higher engagement when the perceived challenge of the task was within their zone of proximal development. Thus, measuring engagement at the task level can reveal how different tasks affect variations in student engagement.

3.2.2 Perceived Learner Control

Besides student engagement, perceived learner control is also important in blended learning. Perceived learner control refers to the extent to which learners believe they have control (Fulton et al., 2013). It implies that different learners can perceive levels of control differently, even when exposed to the same objective learner control which refers to a set of related design choices (Landers & Reddock, 2017). Compared with objective learner control (e.g., Bossant et al.,2022), perceived learner control involves students' perceptions of their control over their learning activities (Gerjets, et al., 2009; Orvis, et al., 2009). In line with Fulton et al. (2013), Karim &

Behrend (2014), Sorgenfrei (2016), and Williams (1996), we distinguish five aspects of perceived learner control, including the perceived control over when to learn (time), where to learn (place), the sequence of learning (path), how fast they learn (pace), and what to learn (content).

In a flexible learning environment, the effectiveness of perceived learner control depends on whether students are able to estimate their ability and decide what they need to do to achieve their learning goals (Chou & Liu, 2005; Lee & Lee, 1991; Jonker, et al., 2020). Additionally, Jung et al. (2019), in the context of online learning, conclude that course content influences student-perceived learner control. When given control over content, students may overestimate their level of competence and skip pertinent content (Fisher et al., 2017). For example, in an experimental study, Brown (2001) found that learners do not always make choices that can promote learning and will invest less in learning when assigned control or freedom in learning. Pridemore and Klein (1991) reached a similar conclusion, i.e., students only choose instructional activities that they perceive will help them. Students may perform poorly if they miss the required course material. However, the relationship between the amount of learning and students' learning performances may vary throughout the learning process. Shute et al. (1998) concluded that at a certain phase of learning, more practice does not lead to higher learning outcomes. The

effectiveness of learner control is also influenced by learner characteristics. For example, Scheiter and Gerjets (2007) found that students' ability to make appropriate choices in learning was associated with their characteristics, such as prior knowledge, self-regulatory skills, cognitive styles, and attitudes toward learning. Therefore, the inconsistent relationship between learner control and student engagement may be associated with particular contextual factors, such as course design and student characteristics.

In many blended courses in higher education, students are not deliberately supported to control time, place, path, and pace because of the fixed on-campus learning part of the courses demanding students' presence at fixed moments and places. However, they often have control over content; in other words, learners can choose what content they will study and decide the amount of specific information they will expose themselves to (Fisher et al., 2017; Granger & Levine, 2010). This means that how learners perceive content learner control may influence students' learning in the context of higher education. The effect of content learner control is uncertain. In a review study, Sorgenfrei and Smolnik (2016) found that the effect of control over content and task selection on the learning process and outcomes was inconsistent, displaying positive, negative, or insignificant effects in different studies. On the one hand, perceiving control over content can

facilitate students to allocate their effort to learning efficiently, although accompanied by a risk of missing knowledge (Sidi & Ackerman, 2024). On the other hand, for online learning in blended learning, students usually devote a relatively small portion of time to a particular learning task and use most of the time intended for these tasks for other activities if they perceive high learner control, according to a review by Rasheed et al. (2020). This indicates that the level of perceived learner control in completing an activity may be associated with the perceived importance of the activity, which might lead student engagement to fluctuate across different activities.

3.2.3 The Relationship Between Perceived Learner Control and Student Engagement

Based on theories of student motivation, we may expect perceived learner control to influence student engagement positively. Theoretically, perceived learner control has been identified as an essential factor for student engagement (Hannafin,1984; Shernoff et al., 2003). For example, in their landmark work on self-determination theory Niemiec and Ryan (2009) claim that learners who perceive more control in learning are more likely to internalize their motivation to learn, which can make them more autonomously engaged in their studies. Furthermore, in their review study Lin and Hsieh (2001), state that perceived learner control may alleviate boredom, frustration, and anxiety because students could skip over materials

they already know or deem irrelevant. Lastly, providing learner control encourages students to take responsibility for their learning, fostering the development of self-regulation skills closely tied to engagement, including setting goals, monitoring progress, and adapting strategies to achieve those goals (Scheiter & Gerjets, 2007).

Compared to theoretical work empirical studies about the relationship between perceived learner control and student engagement are scarce, and the results are inconsistent. On the one hand, some positive results have been identified. For example, based on survey data, Shernoff et al. (2003) conclude that student engagement increases if the learning environment is under students' control where the students might perceive higher control. Similarly, Gerjets et al. (2009) conclude that in an e-learning environment, students who may perceive more control devote more time to learning than those who might perceive less control, which leads to better learner performance. Besides, Lan and Hew (2020), in a study investigating student engagement in MOOCs, conclude that for both course completers and non-completers, perceived learner control is positively related to student engagement. On the other hand, other empirical studies do not find a positive relationship between learner control and student engagement, which indicates that learner control is not necessarily a driver of engagement. For instance, Orvis et al. (2009) found that assigning control to learners did not

have a significant influence on student cognitive engagement. In addition, Taub et al. (2020) in an experimental study, conclude that there is no difference in student engagement including behavioral and emotional dimensions between students who experienced higher learner control and low learner control in a game-based learning environment.

3.3 This Study

Previous studies indicate the importance of student engagement in learning. Specifically, student engagement, which fluctuates across different activities, is a significant indicator of learning outcomes. It is influenced by multiple factors, among which perceived learner control is commonly believed to be a significant factor in blended learning. However, the scarcity of relevant empirical studies and the diversity of results suggest that the line of research regarding the relationship between perceived learner control and student engagement requires further exploration in the context of blended learning. The existing studies have two limitations which might be the reasons for the inconsistent results in current literature. First, in most previous studies (e.g., Jung et al., 2019), learner control and student engagement were measured at course level. Second, in most previous studies, perceived learner control was investigated as a whole (e.g., Zhang et al., 2017). Therefore, in our study, we aimed to improve our understanding of the relationship at the activity level between perceived learner control

over content on the one hand and student engagement on the other, which can benefit blended-course designs regarding how much learner control should be provided to students.

The research questions (RQ) in this study were:

RQ1: What are students' perceived learner control and engagement in different learning activities in a blended course?

RQ2: How does perceived learner control relate to student engagement in different learning activities in blended learning?

3.4 Method

3.4.1 Context and Participants

The data from questionnaires and interviews were collected from students attending the blended bachelor course European Law at a large research-intensive university in the Netherlands. Students enrolled in the course were second-year law students pursuing their bachelor's degree. Other information, such as participants' age and gender, was considered irrelevant to our study.

The course included multiple learning activities such as reading literature, knowledge clips, workgroup assignments, intensive or extensive workgroups, and lectures. The course focused on enhancing students' understanding of European law through various methods. Relevant literature, available online, formed the cornerstone of the curriculum. Weekly digital

knowledge clips, hosted on Brightspace, introduced each week's theme, presented by a lecturer, serving as the basis for further exploration throughout the week. Intensive workgroups (small groups) fostered in-depth discussions and analysis of assigned materials, while extensive groups (big groups) provided overviews of answers to assignments, with recordings available online. While students had the flexibility to choose their preferred educational format each week, they were encouraged to participate actively in intensive sessions, submitting weekly assignments online. Weekly lectures delved into complex topics and their real-world relevance, with recordings for review. The variety in the difficulty level of the learning activities was rather consistent during the course at a lower cognitive level.

3.4.2 Procedure and Measurement Instruments

Procedure

All students participating in the course program were asked to participate in this study through advertising by the first author and by the teachers who taught in the lectures and supervised the workgroups. Students were informed of the goal of data collection, and their participation in the research was neither mandatory nor related to their course scores. The students were also informed that if they completed the questionnaires they received throughout the courses, they could win €20 worth of lottery tickets as an additional incentive to participate. To capture students' experiences in

different activities and reduce response bias and memory recall errors, the students were asked to complete the questionnaires regarding each specific learning activity instead of reflecting on their experiences at the end of the course. To not over-ask students to complete the questionnaires within one week, we randomly split the student group into five sets of 160 students and spread out the workload of completing all the items across 6 weeks. Each set of students received invitations to complete the questionnaires regarding different activities separately during each of the six weeks of data collection. In week six, students received the questionnaire regarding the same activity as they did in the first week. These questionnaires were distributed online. In the end, 225 responses on various questionnaires related to the learning activities were gathered from 110 students. The number of participants in different groups who completed the questionnaires in each learning activity is presented in Table 3.1. After data collection, we created five datasets, one for each learning activity, with students' first responses regarding a particular activity. In addition, a composite dataset was formed by combining all participants' first responses throughout the data collection.

We conducted interviews after the online survey, and the aim of the interviews was to provide qualitative insights, complementing the quantitative findings. Purposeful sampling was adopted because it allowed us to recruit participants with a comprehensive understanding of

instructional learning activities in this course. We first checked the response rate of the online survey, and 16 students consistently completed the questionnaires more than five out of six times. These students were invited by email for a 15-minute interview and were informed that they could receive €5 for participating in the interview, and seven students replied affirmatively. The seven students vary in their perceived learning control and engagement, both across different learning activities and among students. With the students' consent, all interviews were recorded and transcribed for analysis. In the transcripts, the participants' names were replaced with pseudonyms. Research clearance was obtained from the institutional research ethics committee.

Table 3.1 *Overview of Responses from Different Groups for Different Activities in Different Weeks*

Activities/Weeks	1	2	3	4	5	6	Total
Literature	11 (G1)	12 (G5)	4 (G4)	5 (G3)	4 (G2)	6 (G1)	42
Knowledge clips	16 (G2)	9 (G1)	4 (G5)	4 (G4)	3 (G3)	5 (G2)	41
Assignments	12 (G3)	15 (G2)	7 (G1)	7 (G5)	3 (G4)	5 (G3)	49
Workgroups	21 (G4)	11 (G3)	9 (G2)	7 (G1)	5 (G5)	2 (G4)	55
Lectures	13 (G5)	7 (G4)	2 (G3)	5 (G2)	7 (G1)	4 (G3)	38
Total	**73**	**54**	**26**	**28**	**22**	**22**	**225**

Note. G1=Group 1, G2= Group2, G3=Group 3, G4=Group 4, G5=Group

Perceived Learner Control and Student Engagement

We developed five task-level questionnaires for student engagement and perceived learner control. The items for perceived learner control and student engagement were similar across different activities. All items are rated on a 5-point Likert scale, ranging from 1 to 5 with 1= does not at all apply to me, and 5= does extremely apply to me (see Table 3.2). The questionnaires were developed in English by four of the authors; one of the authors translated the questionnaires into Dutch, and two authors checked the translations.

The learner-control questionnaire (based on De Boer and Collis (2005), Karim and Behrend (2014), Manwaring et al. (2017), and Sorgenfrei and Smolnik (2016)) originally contained four items. The reliability of the scale was tested in the datasets of five different activities (see Appendix B1). As there were only four items, we applied the Spearman-Brown formula for test length to generate the predicted reliability for six similar items. The statement "I felt that I could decide what I wanted to learn while I am doing an activity" did not contribute to the reliability of the scale. Unlike the other three items, it primarily assessed students' decision-making abilities rather than their perceptions of freedom in learning activities. Therefore, we decided to remove it to improve the questionnaire's reliability (see Table 3.3). The remaining three items are "I felt that I needed to read the

literature", "I felt that I had the freedom whether or not to read the literature", and "I felt that reading the literature was required".

The questionnaire on student engagement (see Appendix B2-B4) comprised behavioral engagement with three items, emotional engagement with four items, and cognitive engagement with three items, and was based on a measure developed by Van der Rijst et al. (2023). Items were reformulated based on the in-the-moment scale developed by Henrie (2016) (see Table 3.2). As with the learner-control scale, according to the predicted reliability based on the Spearman-Brown formula for test length, all scales of student engagement showed good reliabilities in the five datasets (see Table 3.3). In the end, each learning-activity questionnaire consisted of ten items on student engagement and three items on learner control.

Table 3.2 *Overview of Measurement Instruments*

Variable	Definition	Sample Items
Perceived Content Learner Control (3 items)	Learners' beliefs regarding the extent of their control over learning content in a learning activity	I felt that I needed to do the learning activity.
Behavioral engagement (3 items)	Involvement in learning and academic tasks including behaviors (Skinner & Belmont, 1993)	I put in effort while doing the learning activity.
Emotional Engagement (4 items)	Positive emotions during task involvement and absence of negative emotions (Reeve, 2013)	I enjoyed doing the learning activity.
Cognitive Engagement (3 items)	The extent to which information processing can promote deep understanding and expertise (Fredricks, et al., 2004)	I tried to make sense out of the different ideas while doing the learning activity.

Note. ¨the learning activity¨ in the sample items was replaced by a particular learning activity in the five different questionnaires

Table 3.3 *Predicted Reliabilities of Scales*

Scales	Number of Items	α in Literature Dataset	α in Knowledge Clips Dataset	α in Assignment Dataset	α in Workgroup Dataset	α in Lecture Dataset
Learner control	3	0.91	0.70	0.86	0.86	0.86
Behavioral Engagement	3	0.95	0.92	0.93	0.80	0.85
Emotional Engagement	4	0.79	0.92	0.89	0.85	0.86
Cognitive Engagement	3	0.91	0.68	0.75	0.71	0.76

Note. The Spearman-Brown formula for test length was applied to calculate the predicted reliability for scales with 6 items. The predicted reliability is k*r/1+(k-1) *r, with k = 6/the number of items in a scale and r= original reliability.

Protocol for Interviews

We developed a protocol for conducting interviews with students about their perceived learner control and engagement in each learning activity. The protocol involved questions intended to identify students' motivations or their interpretations of the goal of the course, their learning experience regarding learner control, and student engagement (e.g., Which learning activity do you think is the most (least) relevant for your engagement? What are your feelings of freedom in the activities? If you can skip a learning activity in the course, which one would that be?)

3.4.3 Data Analysis

To answer RQ1, "What are students' perceived learner control and engagement levels in different activities in the blended course?" we adopted descriptive analysis to display the mean and standard deviations for perceived learner control, behavioral, emotional, and cognitive engagement in each learning activity. In addition, the transcripts of the interviews were analyzed in ATLAS.ti 23. The interview data was used to interpret quantitative data. With this aim, instead of basing on other perspectives, three themes, including perceived learner control, student engagement, and course design in each learning activity, were used for clustering data. Agreement was reached among all authors on this scheme, by which we could identify and sort students' perceptions of five different activities and

their learning experiences. Furthermore, we used a one-way univariate analysis (ANOVA) and a one-way multivariate analysis of variance (MANOVA) to further analyze to what extent different activities explain the differences in students' perceived learner control and engagement. The ANOVA and MANOVA were based on the data of 110 independent observations by retaining only the first response from each participant throughout the six weeks and discarding subsequent responses to keep observations independent. For ANOVA, the independent variable was 'learning activities', and the dependent variable was 'perceived learner control'. For MANOVA, a single independent variable (learning activities) and three dependent variables (behavioral engagement, emotional engagement, and cognitive engagement) were included in this analysis. In addition, the assumptions of normal distributions, moderate correlation among dependent variables, and homogeneity of variances of the groups were met.

To address research RQ2, "How does perceived learner control relate to student engagement in different activities in blended learning," we conducted a correlation analysis between perceived learner control and behavioral, emotional, and cognitive engagement, per learning activity, using SPSS 24. This analysis was based on the composite data of participants' first responses to a particular activity to meet observation

independence.

3.5 Result

3.5.1 Perceived Learner Control and Students' Engagement at the Task Level

To answer RQ1 regarding students' perceived learner control and engagement level in this blended course, we listed the levels of students' engagement and perceived learner control, which were based on quantitative data from 110 participants and the students' perceptions of different activities based on qualitative data from seven interviewees.

In Table 3.4, descriptive statistics were reported regarding perceived learner control, behavioral engagement, emotional engagement, and cognitive engagement in different activities. First, Students perceived the highest learner control over attending lectures and the lowest in watching knowledge clips. Second, students experienced the highest behavior engagement and emotional engagement in attending workgroups and displayed the lowest behavior engagement in reading literature. Third, students showed the highest cognitive engagement in attending lectures while the lowest in reading literature.

Table 3.4 *Descriptive Statistics (n=110)*

	LC Mean (SD)	BE Mean (SD)	EE Mean (SD)	CE Mean (SD)	Number of Participants
Literature	2.77(1.03)	3.46(1.00)	2.83(0.65)	3.25(0.77)	19
Knowledge Clips	2.30(0.63)	4.18(0.70)	3.48(0.57)	3.45(0.66)	20
Assignments	2.44(1.01)	3.55(0.88)	3.19(0.72)	3.46(0.64)	23
Workgroups	3.12(0.88)	4.07(0.55)	3.77(0.56)	3.49(0.59)	32
Lectures	3.19(0.97)	3.60(0.67)	3.72(0.76)	3.79(0.45)	16

Note. LC = Learner Control; BE = Behavioral Engagement; EE = Emotional Engagement; CE = Cognitive Engagement.

Literature is liked least by students. Some students recognized literature as good learning materials; as Susan said, *it was really helpful because it was super clear and easy to understand.* However, most students only scanned the literature but did not read it in detail. Some students interviewed explained why they did not read the literature in detail. As Nancy said, *because of my schedule, I am following five courses at the moment, so I did not have time to read the literature.* Another reason is that students could get the same information from the knowledge clips; as one of the students said, *I read those cases explained in the literature, but I kind of skipped the parts with just text explaining things (Tommie).*

The knowledge clips were highly rated by all students because it is informative and very relevant to the literature. Students perceived watching knowledge clips as more obligatory than other learning activities and did not skip over them but watched them in detail. The relevance of the knowledge clips was emphasized by most students interviewed. For example, *I think the most appealing to me was the knowledge clips* (Kevin). The following two quotations illustrate the reason why students recognize knowledge clips as relevant. As Susan mentioned, *the knowledge clips were definitely in the first place simply because the professors pinpointed information from the literature.* In addition, Tommie mentioned that *knowledge clips made the literature a lot easier because the clips saved reading time for me, which*

was nice. These quotations indicate that the content of knowledge clips played a vital role in students' engagement and perceived learner control.

The assignments were in the format of *a big assignment and some sub-questions (Amy),* and these assignments function as tools to *recognize questions and prepare for the exam (Amy).* Many students perceived low learner control in doing assignments. This may be because students needed to finish the assignments to meet the requirements for access to intensive workgroups: *I always prepared to win intensive workgroups (Susan),* and *we are not allowed to go to intensive workgroups without doing assignments (Nancy).* Moreover, they did not enjoy doing the assignments. When working on assignments, students experienced a high workload in completing them. As Tommie said, *the assignments took like two hours to do, but before you can do them, you need to do the clips and the literature*, which suggests students' relatively low emotional engagement in doing assignments. Some students mentioned in the interviews that the teachers had never checked the assignments, which led to low behavior engagement in completing the assignments.

The workgroups were more enjoyable to students than other activities, and students were more engaged in learning during the workgroups. Specifically, intensive workgroups were structured and well-organized, and students had the opportunity to engage in in-depth

discussions on relevant knowledge. For instance, Desi said, *I find it the best part of the whole course because you implement what you studied, and you also get to know how to implement it correctly.* All students mentioned that they were quite engaged in intensive workgroups because they could interact with teachers and obtain immediate responses. Students also emphasized the role of intensive workgroups in preparing for the exam as a reason to go to these sessions: *On the exam, the questions are very much like the workgroup (Amy).* Students rated the quality of the extensive workgroups highly. For example, Tommie said that the teacher in the *extensive workgroups summarized everything very well.* Students felt they had freedom in deciding which workgroups to attend. This may be related to the availability of the extensive workgroups. If they could not make it to the intensive workgroups, they would choose the optional extensive workshops or watch the recordings of the extensive workshops.

The lectures were used to provide extra information regarding different topics but were not highly relevant to the exam. For example, Susan said, *I don't particularly feel like it helped me a lot for the exam, but they were really interesting and gave more contexts in which cases are and how to properly apply them.* During the lectures, students had a chance to ask the teachers questions on matters they did not understand. Some professors also customized the lectures more closely to their areas of

expertise. Students perceived high freedom to skip the lectures and watch the recordings. For instance, Desi reported, *well, I think it is because the lectures will be posted on the online learning system, so they can just watch it later.* There were also some benefits for students watching recorded lectures online: *I like to watch it back in my room so that I can pause it and make some good notes, rather than having to be there in person, because the lectures go a bit too quickly to take good notes (Ruben).*

To further investigate to what extent students' perceived learner control and engagement levels were determined by different activities, we applied ANOVA and MANOVA in the next step, testing how different course activities related to student-perceived learner control and student engagement, respectively. First of all, from Levene's test F (4,105) = 1.78, p = .14, the robustness of the one-way ANOVA was guaranteed. The result indicated that the effect of activities was significant for perceived learner control, F (4, 105) = 4.11, p = .04, the effect size, eta squared (η^2), was 0.36, indicating a moderate effect. As follow-ups, the output of the REGWQ test suggests that students' perceived learner control differed significantly between watching knowledge clips (M = 2.30) and attending workgroups (M =3.12), and between attending lectures (M =3.19) and watching knowledge clips (see Table 3.5), which means students thought watching knowledge clips was more necessary than attending workgroups and lectures. In

addition, the assumption of homogeneity of covariances in MANOVA was accepted on the basis of Box's M test (p = .33 > .05), which means the robustness of the MANOVA tests was guaranteed. A statistically significant MANOVA effect was obtained (Pillai's Trace = .42, F (16, 420) = 4.00, p < .001). The independent variable 'learning activities' accounts for 14 % of the total variance (partial η^2 =.14). Levene's test of homogeneity of covariances shows that the assumption of homogeneity of variance was satisfied for behavioral, emotional, and cognitive engagement (F (4,105) = 2.40, p = .06; F (4,105) = 1.49, p = .21; F (4,105) = 0.71, p = .59). ANOVA models for behavioral and emotional engagement were statistically significant. The obtained effect sizes were η^2=.14, and η^2=.23 for behavioral engagement and emotional engagement, respectively. The results indicate that the differences in behavioral engagement and emotional engagement across different activities contributed to the multivariate effect. We applied a post-hoc comparison using REGWQ, which showed that behavioral engagement differed significantly between watching knowledge clips (M = 4.18) and reading literature (M = 3.46), and between doing assignments (M = 3.55) and watching knowledge clips (see Table 3.5), indicating that the effort students put into watching knowledge clips exceeded that for reading and doing assignments. Emotional engagement differed between reading literature (M = 2.83) and watching knowledge clips (M = 3.48), attending

workgroups (M = 3.77) and lectures (M = 3.72), and between doing assignments (M = 3.19) and attending workgroups (see Table 3.5). This suggests that students enjoyed watching knowledge clips, attending workgroups, and attending lectures more than reading literature, and students liked attending workgroups more than doing assignments.

Table 3.5 *Post-Hoc Paired Comparisons*

Learning activities	N	Learner Control		Behavioral engagement		Emotional Engagement		
		Subset 1	Subset 2	Subset 1	Subset 2	Subset 1	Subset 2	Subset3
Literature	19	2.77	2.77	3.46		2.83		
Knowledge Clips	20	2.30			4.18		3.48	3.48
Assignments	23	2.44	2.44	3.55		3.19	3.19	
Workgroups	32		3.12	4.07	4.07			3.77
Lectures	16		3.19	3.60	3.60		3.72	3.72
Sig.		0.38	0.06	0.06	0.13	0.21	0.09	0.49

3.5.2 Relationship between Perceived Learner Control and Student Engagement

To obtain insight into the relationship between perceived content learner control and student engagement, we tested how perceived learner control related to student engagement in different blended learning activities by performing a bivariate correlation analysis. As Table 3.6 shows, there were significant negative correlations between perceived content learner control and behavioral engagement (r = -.56, p < .01) and cognitive engagement (r = -.50, p <.01) regarding reading literature. This means that the more learner control students perceived in reading literature, the less behavioral and cognitive engagement they displayed during this activity. A significant negative correlation between perceived content learner control and behavioral engagement (r = -.43, p <.01) was also identified regarding attending lectures, which indicates that if students perceived more learner control in watching lectures, they would display less behavioral engagement in this activity. The other correlations are all insignificant.

Table 3.6 *Correlation analysis of learner control on student engagement*

	Variable	Pearson's Correlation			
		LC	BE	EE	CE
Literature	Learner control	1			
	Behavioral engagement	-.56**	1		
	Emotional engagement	-.26	.70**	1	
	Cognitive engagement	-.50**	.77**	.68**	1
Knowledge Clips	Learner control	1			
	Behavioral engagement	-.16	1		
	Emotional engagement	.01	.36*	1	
	Cognitive engagement	.15	.16	.47**	1
Assignments	Learner control	1			
	Behavioral engagement	-.15	1		
	Emotional engagement	.18	.47**	1	
	Cognitive engagement	.10	.53**	.52**	1
Workgroups	Learner control	1			
	Behavioral engagement	-.24	1		
	Emotional engagement	.06	.54**	1	
	Cognitive engagement	-.14	.47**	.45**	1
Lectures	Learner control	1			
	Behavioral engagement	-.43**	1		
	Emotional engagement	-.25	.54**	1	
	Cognitive engagement	-.15	.67**	.59**	1

Note. $p < 0.05$.; $p < .01$. LC = Learner Control; BE = Behavioral Engagement; EE = Emotional Engagement; CE = Cognitive Engagement.

3.6 Discussion and Conclusions

3.6.1 Discussion

We investigated the variance of perceived learner control and student engagement across different activities and tested the relationship between perceived learner control and student engagement at the activity level in a blended course in higher education. In this course, perceived learner control, behavioral engagement, and emotional engagement varied across different activities. Furthermore, the relationship between perceived learner control and student engagement was generally insignificant. However, for reading literature we found that the more learner control students perceived, the less cognitively and behaviorally engaged they were. In addition, regarding attending lectures students displayed less behavioral engagement if they perceived lower learner control.

Student Engagement and Perceived Learner Control in Various Activities

Our findings indicate that the type of learning activity affects perceived learner control, behavioral engagement, and emotional engagement of students. First, students perceived more control when attending workgroups and lectures than when watching knowledge clips. This may be because students could choose whether or not they attended workgroups and lectures. Specifically, students could attend either intensive or extensive workgroups. If they missed both, they could watch the

extensive workgroups recorded online. Lectures were also recorded and posted online; however, there was no alternative for the knowledge clips. In addition, students highly valued the content of the knowledge clips because the teacher emphasized the essential parts of the course. This may be a reason why students were eager to watch the clips.

Second, students showed higher behavioral engagement when watching knowledge clips than when reading literature or doing assignments. Although the three activities were all individual, in the knowledge clips students saw a professor explaining relevant knowledge and presenting auditory and visual information. Following the cognitive theory of multimedia learning (Mayer, 2005), people learn better when both auditory and visual channels are used rather than just one or the other, which fits in with the higher behavioral engagement students display in watching knowledge clips. This is because combining auditory and visual information enhances learning by offering complementary representations. Specifically, teachers can provide additional explanations that visual information, for example, informative text on slides, alone cannot fully convey. Another reason may be that in the knowledge clips, there was an actual person presenting, whereas the literature and assignments only contained words. This corroborates a conclusion by Liao et al. (2023), who claim that more teacher presence can lead to higher student engagement.

Third, students were less emotionally engaged in reading literature than in watching knowledge clips, attending workgroups, and attending lectures. Students could not navigate to the most relevant information in reading literature as quickly as when watching knowledge clips. Daud and Ghani (2019) already conclude that the ease of finding information is a factor positively influencing student engagement. For example, teachers may improve student engagement by designing clearer and more concise interfaces to make it easier for students to find relevant information. Moreover, the increased emotional engagement observed in students viewing knowledge clips featuring a real person, as opposed to reading literature, can also be explained by the findings of Liao et al. (2023). In addition, workgroups and lectures were more interactive than the literature, which may have triggered the positive perceptions. This is consistent with the findings from an experimental study by Chiu (2021), which indicate the importance of interactive elements in promoting student engagement. The students in our study were also less emotionally engaged in doing assignments than in attending workgroups. In accordance with Smith's (2019) finding that "students' workload and time pressures were significantly associated with negative emotions", this result can be explained by students' high workload in finishing individual assignments. Students had to finish them individually to gain the opportunity to attend

intensive workgroups. Moreover, cognitive engagement did not vary across different activities. In conclusion, the availability of options for a particular task and the content of the task itself appears to have played a crucial role in shaping students' perceived learner control. Furthermore, the use of diverse multimedia information can enhance students' behavioral engagement, and the accessibility of a task and the level of interactivity it offers may have an impact on students' emotional engagement with the task.

Relationship between Perceived Learner Control and Student Engagement

Our results further extend those of previous studies investigating the relationship between perceived learner control and student engagement in the context of blended learning in higher education. The correlation between perceived learner control and student engagement suggests that at task level, perceived learner control was not significantly related to student engagement in general. This partially corroborates the results of a previous study by Karich et al. (2014), who conclude that perceived learner control is not a powerful indicator of learning. The insignificant relationship between perceived learner control and student engagement also suggests that not all students were able to use learner control wisely, which echoes Chou and Liu (2005), Lee and Lee (1991), and Williams (1993), who claim that only if students are able to make the appropriate decisions with learner control that they perceive they can attain a higher engagement in learning. However, our

study identified three moderately significant negative correlations in different activities, which suggests the effect of perceived learner control is more robust in some typical activities than in others. Specifically, the more perceived learner control the students had, the less effort they put into reading literature and the less they could make sense of what they were learning when reading literature. Similarly, the higher learner control the students perceived in attending lectures, the lower behavioral engagement they showed. These findings fit in with those from a review study by Sorgenfrei and Smolnik (2016), who claim that learners may put less effort into the learning process when given control over content and task selection. Students who perceived lower learner control may be those who are more disciplined (William, 1996). These students were more likely to read the literature and attend the lectures even if they perceived the learning activities as irrelevant to their learning. Students thought they could gain relevant information more efficiently by doing other activities than reading literature and considered the lectures less relevant to exams than other activities. Thus, in these two activities, students who were more disciplined may be attending these two activities but are not engaged in them. One difference between these two activities is that students' perceived learner control influenced only their cognitive engagement in reading literature, not in attending lectures. The unaffected cognitive engagement may indicate

that 'not attending lectures' was a good option because the cognitive aspect of learning was not affected. This echoes Shute et al. (1998), who claim that at some point in the learning process, the additional exposure to knowledge did not provide sufficient return. In conclusion, not only may instructional features of a learning activity play a role in student engagement, but the relationship between perceived learner control and student engagement could also be explained by individual differences. Moreover, the adverse impact of perceived learner control on student behavioral engagement does not necessarily imply a disadvantage as long as the cognitive engagement is not affected; it may indicate that students made effective choices for their learning.

3.6.2 Limitations

First, because for this study we collected data in a law course in higher education, some limitations in the application of the results in other disciplines need to be acknowledged. In law school there are extensive reading requirements for students, making the results less directly applicable to other subjects, for example, those involving additional practical learning experiences. In addition, this study was conducted in a course which offered students much freedom, so the results may not be applicable in courses with a low level of objective learner control. Further research is needed to get an understanding of the relationship between perceived learner control and

student engagement in other domains, such as applied science, and in some courses which do not provide students with much objective learner control. Second, in order to keep the student workload limited, the data were collected once a week instead of immediately after every learning activity. Therefore, there is a risk that our results do not fully represent students' experiences in a learning activity. It is advisable in the future to consider studies focusing on particular activities with a more immediate data collection strategy, and so obtain data that more accurately represents student experiences in those particular learning activities. Besides, the high workload of completing multiple questionnaires over six weeks led to a high attrition rate, which limited the sample representation of the data. Thus, we advise that future longitudinal research should focus on one learning activity, or on one week, to enhance the retention rate and obtain enough data for advanced analyses.

3.6.3 Concluding Remarks

In conclusion, this study has shed light on the relationship between perceived learner control and student engagement in the context of blended learning in higher education. Our results are obtained in this blended Law course in which students' perceived learner control only displayed negative influences on student engagement regarding reading literature and attending lectures; while in other activities, perceived learner control was not a

significant factor influencing student engagement. According to our results, we assume that the instructional features of an activity may have a greater influence in promoting student engagement than perceived learner control, which corroborates Pridemore and Klein's (1991) claim that students' choices of instructional activities depend on the perceived usefulness of these activities. At the same time, individual differences should not be ignored, as they may influence how students perceive learner control, how they perceive the instructional feature of the course, and how they use learner control, thus affecting student engagement.

Based on our study's findings, we recommend that teachers consider tailoring the degree of learner control provided to students based on their needs and varying across different learning activities. Specifically, in less interactive activities like literature reading, instructors may opt to offer students less control while simultaneously emphasizing the relevance of these activities to their overall learning outcomes to reduce the risk of low engagement in doing these activities. Additionally, educators and course designers could strategize ways to enhance the appeal of learning tasks and accommodate individual differences among students.

Furthermore, we recommend that future research should take task-instructional features into consideration when investigating the relationship between perceived learner control and student engagement. Furthermore, as

perceived learner control did not significantly influence student engagement, we speculate that the way students actually use learner control may play a more critical role than perceived learner control. Therefore, we recommended that future research should focus on how students use learner control by using authentic data such as their digital footprints or in-the-moment logbooks. Future studies could also address students' perceived learner control over other aspects, such as pace, path, and their relationship with engagement, because there may be other aspects of learner control that are significant factors for student engagement than content learner control.