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Effects of Blended Learning Teaching Strategies on Students' Self-Direction

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Abstract: This contribution is about teaching strategies in blended learning environments and its effects on students' self-direction. Literature shows a correlation between teachers' teaching approaches, learning environments and students' engagement in their learning activities. Indeed, student-centered teaching approaches encourage students' active and deep learning. Several researchers highlighted that the technical aspects of blended learning can also enhance student-centered learning activities (Peraya *et al.*, 2014). Our contribution to this perspective is meant to provide more insights on how teaching strategies are used in a blended learning environment and to study how students develop their personal competencies, such as self-direction, in this particular learning context. Our main hypothesis is that student-centered teaching approaches in an interactive blended learning setting have a positive impact on students' self-direction. This work, performed at the University of Strasbourg, involves lecturers who were chosen among those who teach at the undergraduate level in diverse subjects. First, teachers were invited to declare their teaching approaches by completing a questionnaire. Then, some observations of their face-to-face sessions and online platform helped to identify their real teaching approach and the pedagogical design of their online environment. This method pointed out a possible difference between declared and observed teaching approaches. A pre-post questionnaire, which aimed to measure participants' progress on self-direction, was completed by the students of these teachers. By then, the aim was to show if there is a relationship between identified teaching strategies and students' self-direction. Collected data showed that students whose lecturers practice student-centered teaching approaches and provide an online communication tool or implement a flipped classroom scenario in their blended learning environment developed their self-direction in learning.

Keywords: Teaching approaches, learning environments, blended learning, undergraduate students, self-direction.

1. Introduction

International organizations, such as UNESCO and the European Union, affirmed that creativity, critical thinking, collaboration and digital literacy are the essential competencies for a good personal, societal and professional life (Voogt & Roblin (2012) in Lim, Cho & Kim, 2016). Indeed, the use of technology in everyday life has enhanced the communication as well as the construction, distribution and the reconstruction of knowledge. Since digital technologies are continually being created and disseminated, the demands of the labor market are also evolving continuously. As an educational institution that aims to prepare students to cope with the working environment and to become a professional in their respective fields, higher education has identified their needs to shape students to be an active and self-directed learner. These skills will prepare them for their future lives, so they will be able to learn during their whole life after their study time, to analyze problems, to seek solutions to the issues of society and to implement them (UNESCO, 1998).

There is no doubt that higher education means to encourage lifelong learning, to help students to develop their professional skills and to invite them to pursue their objectives. To achieve this goal, several sets of teaching models have been tested, and it turns out that teaching strategies that engage learners to be active in their learning process should be put in place (Charles, Lasry & Whittaker, 2013; Famose & Margnes, 2016). In the current digital era, blended learning has become one of the options to achieve this goal. Its positive impact, as a method that aimed to enhance students' engagement in learning (Page *et al.*, 2017) and develop their autonomy as well as their active participation in learning, are becoming the reasons why blended learning is more and more implemented (Peraya *et al.*, 2014; Kintu *et al.*, 2017; Ibrahim *et al.*, 2017). Peraya and Peltier (2012) identified two groups of blended learning environments: teacher-centered and student-centered. Indeed, the results of the implementation of each environment are different. On that perspective, it would be interesting to investigate teaching strategies adopted in each blended learning environment and to study how students develop their self-direction in that learning context.

In France, the high number of undergraduate failures is a recurring problem. According to Coulon (2005), the transition from high school to the university, in which the learning environment requires different learning strategies, is challenging. Indeed, students are expected to be more autonomous and self-directed, although

the necessity of these competencies to succeed university studies is not explicitly stated. Since our exploratory research showed that undergraduate teachers who designed a blended learning environment did not always adopt a student-centered approach (Adinda & Marquet, 2017), this actual study aims to investigate in detail the teaching approaches adopted. Furthermore, it also aims to analyze in which precisely blended learning context, it is implemented. The second objective of this work is to measure the effect of each adopted strategy to students' self-direction in learning. As teachers' teaching approaches and learning environment are two elements that influence each other and can affect students' behavior in learning, our main hypothesis is that student-centered teaching approaches in an interactive blended learning environment have a positive impact to students' self-direction.

This work involves lecturers from the University of Strasbourg who were chosen among those who teach at the undergraduate level in diverse subjects. In the following sections, the literature review, the findings, the methodology set up, which is based mainly on observations and questionnaires, will be detailed.

2. Blended learning and students' self-direction

2.1 Various blended learning models

Blended learning is a formal education program in which a student learns through online and face-to-face learning sessions with the teacher (Horn & Stakers, 2015). This description fits with francophone researchers' definition of *formation hybride* (Peraya *et al.*, 2014), that points out the possibility for students to have control over time, place and/or learning path. Unlike the Sloan consortium which stated that blended learning environment can be distinguished between online and traditional learning environment through the percentage of its online content (Page, Meehan-Andrews, *et al.*, 2017), Horn and Stakers (2015) and Peraya *et al.* (2014) do not provide a numerical definition for blended learning environments. These researchers proposed their own classification, based on the use of technology in various learning scenarios and contents. Table 1 below describes the type of learning environment according to Page, Meehan-Andrews, *et al.* (2017).

Table 1: Type of learning environment (Page, Meehan-Andrews, *et al.*, 2017)

Type of learning environment	Percentage of online content provided
Web-enhanced learning	Online content less than 30%
Blended learning	Online materials between 30% and 79%
Online learning	Online content more than 80%

Considering that technology, mentoring and students' participation are the important elements of blended learning, Horn and Stakers (2015) stated that the tools used for online sessions must shift their contents and instructions to students' perspective so that they will enable them to have control over their activities. For this purpose, they suggested a blended learning typology that distinguishes four main models: Rotation, Flex, A la carte, and Enriched virtual. This classification also focused on students' activities in different learning scenarios that combine face-to-face and online sessions.

For Peraya and Peltier (2012), a blended learning setting is composed of several dimensions including the articulation of face-to-face and online learning, human mentoring, remediation, the use of the techno-pedagogical environment and its degree of openness. From this point of view, six types of blended learning models are proposed (See table 2).

Table 2: Models of blended learning environment (Peraya & Peltier, 2012; Peraya *et al.*, 2014)

Group	Model	Description
Teacher-centered blended learning environment	1. Scene (<i>Scène</i>)	Content-oriented configuration. The online environment is composed principally of textual resources, which are used to support the face-to-face course.
	2. Screen (<i>Écran</i>)	Content-oriented configuration. The online environment is used to support the face-to-face course. The resources provided online are composed of textual and numerous multimedia resources.
	3. Cockpit	The online management tools are used to allow students to manage their learning. Several reflexives activities are also provided.
Student-centered blended learning environment	4. Crew (<i>Équipage</i>)	This model focuses on building knowledge and supporting interpersonal interaction
	5. Metro	This model fosters students' freedom of choice. It provides a possibility for students to access external resources and offers a mentoring and supports
	6. Ecosystem (<i>Ecosystème</i>)	This model characterized by the exploitation of a large number of technological and educational possibilities.

This typology, also confirmed by Peraya *et al.* (2014), divides blended learning environment into two groups: teacher-centered and student-centered. Models of blended learning presented in this typology are differentiated by various categories of resources used and different degree of openness of its online learning environment. Despite their different models, the typology proposed by Horn and Stakers (2015) and, Peraya and Peltier (2012) take into account teachers' roles and their teaching approaches.

2.2 Teaching approaches and students' self-direction

Technologies are not the only aspect that could enhance students' success in their learning process. The implementation of Information and Communication Technologies (ICT) requires a reorganization of teaching contents (Marquet, 2011). Students' behaviors in learning are also influenced by their personal experiences and their learning environments, which include teaching contents provided and teaching approaches adopted by teachers (Bandura (1986) cited in Ponton & Carr, 2012). The typology of teaching approaches suggested by Kember (1997) is widely used to describe teachers' conceptions, both in traditional situations (Trigwell *et al.*, 2005; Rege Colet & Rovero, 2015) and in blended learning (Lebrun *et al.*, 2014; Peraya & Peltier, 2012), (See Table 3).

Table 3: Groups of blended learning models proposed by Peraya and Peltier (2012) in Kember's (1997) typology of teaching approaches

Groups of blended learning models	Groups of teaching approaches	Types of teaching approach
Teacher-centered blended learning environment (TC)	Teacher-centered/content-oriented approaches (TC)	Imparting information
		Transmitting structured knowledge
		Students-teacher interaction/apprenticeship
Student-centered blended learning environment (SC)	Student-centered/learning-oriented approaches (SC)	Facilitating understanding
		Conceptual change/intellectual development

Each teaching approach represents a particular way of teaching and teachers' conception of their activities. It is influenced by teachers' experiences of teaching and learning (Prosser *et al.*, 2005), and affects students' learning approaches as well as their perception of their learning environment (Entwistle, 1991). Hiemstra (2015) stated that students perform deep learning when they are involved and participate actively in their learning process. Indeed, these students are also more motivated and engaged in their learning process (Lim & Wang, 2016). These works suggest that student-centered teaching approaches, in which students develop a sense of agency, an ability to guide their learning (Horn & Staker, 2015) and their critical thinking, are the most suitable way to enhance students' deep learning. Besides, student-centered teaching approaches also aim to foster students' conceptual change and develop students' metacognitive competence, which is essential for self-regulation and resource planning in learning (Famose & Margens, 2016). Table 4 below presents teaching activities which can represent each type of teaching approach.

Table 4: Type of teaching approaches and its practical implementations (adapted from Kember (1997), Trigwell, *et al.* (1999), and Shipton (2011))

Groups of teaching approaches	Types of teaching approach	Teaching activities
Teacher-centered/ content-oriented approaches (TC)	Imparting information	Teachers' objective is to transfer all information that students need. Examples of activity: Lecture-based teaching or "chalk and talk."
	Transmitting structured knowledge	Teachers' objective is to transfer the information and to help students to understand it: Students are informed of the lesson plan, teachers use examples and analogies. Examples of activity: Lecture-based teaching with a structured guide.
	Students-teacher interaction/apprenticeship	Teachers' objective is to transfer information and to help students to understand it. Examples of activity: Lecture-based completed with discussion session between teacher and students or peer exchanges about the content transferred.
Student-centered/ learning-oriented approaches (SC)	Facilitating understanding	Teachers' objective is to help students to learn by themselves and to "become more effective as a teacher." Examples of activity: Debate, tutorial, project-based learning, working in small groups.
	Conceptual change/intellectual development	Teachers' objective is to favor the evolution of students' understanding and perspective of the subject matter. Their aim is to become "more effective in facilitating students' learning." Examples of activity: Debate, reflexive discussions, problem-based learning.

Self-direction is grounded in two concepts: the will to learn or self-determination and the self-regulation ability (Carré, 2003). Based on a sense of agency and self-effectiveness, students' self-direction in learning can be indirectly affected by student-centered teaching approaches and blended learning environment. This indirect relation is highlighted by Carré *et al.* (2011) by the fact that the instructional design of a learning environment would foster students' self-direction if the techno-pedagogical environment provides the opportunities for personal decision and encourage interaction or collaboration. Through this perspective, the student-centered blended learning environments are the preferred one to enhance students' self-direction in learning.

3. Research methods

Since teachers can adopt teacher-centered teaching approaches when the blended learning setting is student-centered (Adinda & Marquet, 2017), the objective of this research is to define the most efficient teaching strategies to develop students' self-direction in learning. To investigate lecturers' teaching strategy, the main research questions are: (1) what are the teaching approaches adopted and in which blended learning environment are they implemented? (2) what are the possible aspects that can foster students' self-direction in a blended learning environment? Quantitative methods had been used to collect the data through a survey and in-class observations.

3.1 Participants of the study

The study was conducted from September 2017 to December 2017. Two groups of respondents were selected: (1) undergraduate students, and (2) lecturers who teach at the undergraduate level. It covered 204 students and 12 lecturers of the University of Strasbourg from diverse subjects: Sociology, Languages, Mathematics, Economics, Law, Physics, Educational Sciences, and Communications.

3.2 Tools and procedure

Lecturers were invited to declare their teaching approaches and their blended learning type via an online survey. To investigate these aspects, a French translation of the Approach to Teaching Inventory (ATI) (Trigwell *et al.*, 2005) was used. A self-positioning test (Burton *et al.*, 2012; Lameul *et al.*, 2012) was also provided in the questionnaire in order to investigate the type of the designed blended learning environment. This research identified the absence of an instrument to classify blended learning environment into the typology of Horn and Staker (2015). Moreover, we also pointed out the conformity between the typology of blended learning environment as suggested by Peraya and Peltier (2012) and the referenced typology of teaching approaches (Kember, 1997). Indeed, the blended learning typology used in this paper is the model proposed by Peraya and Peltier (2012) and Peraya *et al.* (2014). The results of the self-positioning test also refer to this latter classification.

During the semester, two observations of lecturers' face-to-face meetings were organized. An observation to their online learning platform was also performed. The observation guideline was developed using Kember's typology of teaching approaches, and various teachers' roles from Chesnais (1998), Depover and Quintin (2011), Clutterbuck (2014), Paul and Fabre (2014), and Rodet (2016). This instrument aimed to identify teachers' real teaching approaches, their online activities, and the communication tools used. It also pointed out any possible implemented pedagogical methods, in addition to blended learning methods (problem-based learning, flipped classroom, project-based learning, *etc.*).

To discover the effect of lecturers' strategies on their students' self-direction in learning, students were asked to fill in a French version of Self-Directed Learning Readiness Scale (Guglielmino, 1977) before and after attending their course. Table 5 presents the indicators used to measure students' self-direction in learning. The results of each questionnaire session were compared to identify the development or regression of students' self-direction.

Table 5: Survey guideline of SDLRS (Self-Directed Learning Readiness Scale) (Guglielmino, 1977)

Variable	Sub Variables	Indicators	Question items
Participants' self-directed learning readiness	Self-determination	- Initiative and independence in learning	2, 6, 7, 18, 27, 42, 55, 58
		- Acceptance of his own responsibility in learning	8, 13, 15, 20, 21, 40, 50
	Self-regulation	- Openness to learning opportunities	3, 22, 34, 35, 39
		- Creativity	25, 29, 36, 48
		- Ability to use study and problem-solving skills	4, 10, 12, 51
	Self-efficacy	- Self-concept as an effective learner	9, 11, 16, 33, 38, 41, 44, 57
		- Passion to learn	5, 14, 19, 23, 24, 28, 30, 32, 43, 45, 47, 53
		- Orientation to the future	1, 17, 26, 31, 37, 46, 49, 52, 54, 56

3.3 Analysis framework

Data analysis was directed along two principal axes: (1) lecturers' strategies: various teaching approaches adopted and designed blended learning environment, and (2) students' self-direction development. Three main data sources were used: a) Questionnaire: lecturers' responses to ATI and their responses to the self-positioning test, b) observation results, including the data gathered from the platform showing students and lecturers interactions in discussion forum or any other online communication tools provided in the platform, c) students' responses to Self-Directed Learning Readiness Scale (SDLRS). To study students' self-direction level progression or regression, a paired sample t-test was applied to their pre and post-test answers. The whole methodology is summarized in Table 6.

Table 6: Research methods and analysis framework

Specific objectives	Main axes of collected data	Instruments
Investigate lecturers' strategies to teach in a blended learning environment	Lecturers teaching approaches and the type of their blended learning settings	ATI Questionnaire and self-positioning test Observation guide
Identify the effects of lecturers' strategies on students' self-direction	Students' self-direction level in learning	SDLRS Questionnaire (before and after course module)

4. Results

4.1 Teaching approaches and designed blended learning settings: various possible strategies

The observed lecturers teach at the University of Strasbourg. The online learning platform used for their courses was Moodle®. The data collected in Table 7 show the types of blended learning designed by these lecturers.

Table 7: Summary of data collected from 12 lecturers from ATI questionnaire

Lecturer	Answer to ATI:	
	Type of blended learning environment	Type of blended learning environment
a	Type 1 (TC)	g
b	Type 5 (SC)	h
c	Type 5 (SC)	i
d	Type 5 (SC)	J
e	Type 1 (TC)	k
f	Type 5 (SC)	l

Note. TC: teacher-centered, SC: student-centered

Lecturers' answers to ATI show the adopted teaching approaches and the type of their blended learning environment. Table 7 reveals that the designed blended learning environments were both student-centered and teacher-centered. Data presented indicate that 50% of lecturers declared that their blended learning courses were the Metro (the 5th type of blended learning environment), which are student-centered. Other lecturers who stated that their blended learning environments were teacher-centered identified that those match the Scene (the 1st type) and the Screen (the 2nd type of blended learning). There are no communication

tools used in the 1st and 2nd type of blended learning. The use of a Forum was identified in the 5th type of blended learning.

Figure 1 shows the answers provided to the ATI and the observations' results. Numbers 1 to 6 correspond to the types of the blended learning environment. The grey area in this radar indicates that the blended learning environments are teacher-centered (type 1, 2 and 3). The white area covers student-centered blended learning environments (type 4, 5 and 6).

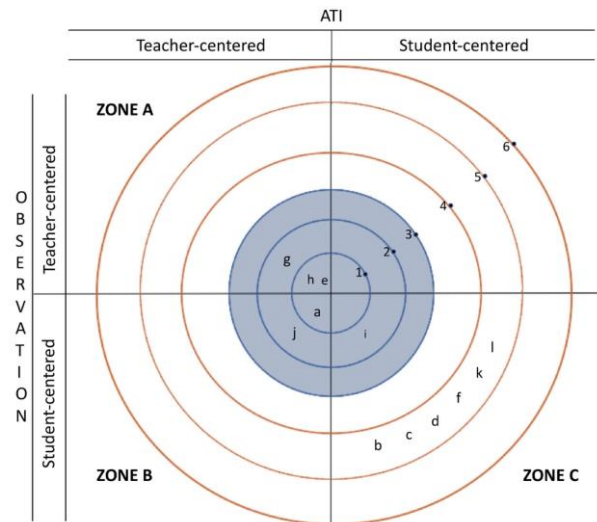


Figure 1: The relation between observed and declared teaching approaches & blended learning types

It appears that lecturers adopt various teaching approaches to teach in a blended learning environment. When the observation results indicate that the adopted teaching approaches are teacher-centered, generally lecturers' responses to the ATI confirm this declaration (see Figure 1: zone A). The observation results also show that lecturers adopt student-centered approaches. However, there is a possibility that lecturers declare in the questionnaire that they adopt a student-centered or a teacher-centered approach to teaching (zone B and C) regardless of the observation. Considering the blended learning types declared, lecturers who report having adopted teacher-centered approaches also design a teacher-centered blended learning environment (see Figure 1: the grey area in zone A and B). Furthermore, zone C of the radar shows the possibility that lecturers may design a teacher-centered blended learning environment while adopting student-centered teaching approaches. In some cases, the observed teaching approaches could be different from the declared ones. This can be seen in the case of lecturer a and j (see Figure 1: zone B).

Indeed, Figure 1 indicates that the approaches adopted do not always represent the designed blended learning environment. As a consequence, three possible teaching strategies in blended learning can be identified:

1. Strategy in zone A: lecturers adopt teacher-centered approaches and design teacher-centered blended learning environments;
2. Strategy in zone B: lecturers design teacher-centered blended learning environments and adopt student-centered or teacher-centered teaching approaches;
3. Strategy in zone C: lecturers adopt student-centered approaches and design teacher-centered or student-centered blended learning environments.

4.2 Students' active participation in learning and self-direction

Students filled out the questionnaire at the beginning and the end of the semester. To analyze the data and to identify their progression on self-direction level during the course module, a paired sample t-test was applied. Data identifying the instructional design implemented in blended courses and students' self-direction evolutions are shown in table 8.

Table 8: Students’ self-direction and blended learning environments

Lecturer	Observed teaching approach	Blended learning type	Communication tools used, and other pedagogical methods applied	Students’ paired sample t-test results
a	SC	1 (TC)	Flipped classroom	t=2.269; p< .05, df 9
b	SC	5 (SC)	-	ns
c	SC	5 (SC)	-	ns
d	SC	5 (SC)	-	ns
e	TC	1 (TC)	-	ns
f	SC	5 (SC)	Forum	t = 1.505; p< .10, df 18
g	TC	2 (TC)	-	ns
h	TC	1 (TC)	-	ns
i	SC	2 (TC)	-	ns
j	SC	2 (TC)	Flipped classroom	t=1.804; p< .10, df 7
k	SC	5 (SC)	Forum and flipped classroom	t=2.577; p< .05, df 13
l	SC	5 (SC)	-	ns

The collected data show that students’ self-direction is increased in 4 out of 12 blended learning courses modules; namely students of lecturers a, f, j, and k. Students of lecturers a and k have developed their self-direction level with the P value of less than .05, while students of lecturers f and j return a P value of less than .10. Figure 1 shows that these four lecturers are located in zones B and C. The observations confirm that these two zones cover lecturers who adopt student-centered teaching approaches, in which they design a student-centered or teacher-centered blended learning environment. Besides, the similarity identified in these four blended learning courses is the use of the Forum as an online communication tool and flipped classroom as the specific pedagogical method applied.

5. Conclusion

This work reveals that the type of blended learning environment does not always match lecturers’ teaching approaches. Our results suggest that, when lecturers have designed a teacher-centered blended learning environment, the adoption of student-centered teaching approaches is possible, especially in a flipped classroom scenario. To answer the questions: what teaching approaches are adopted, and in which blended learning environment they are implemented, we have clear indications that student-centered teaching approaches can be adopted in a student-centered as well as a teacher-centered situation. However, teacher-centered teaching approaches can only be implemented in a teacher-centered blended learning environment.

Regarding the second research question, our main hypothesis was that student-centered approaches in an interactive blended learning environment have a positive impact on students' self-direction. However, this is only partially confirmed by our results. Data from lecturers' answer to ATI questionnaire and observations show that students can develop their self-direction in both student-centered and teacher-centered blended learning. In a teacher-centered environment, the scenario that encourages students' active learning, such as flipped classroom, becomes important and can enhance students' self-direction. When it comes to a student-centered blended learning environment, data show that students' self-direction is not automatically achieved by a simple adoption of student-centered teaching approaches. Learning scenario that fosters students' participation and the active use of online communication tools for discussions are also important to improve students' self-direction.

We can see that, generally, there is a correspondence between declared by teachers and observed teaching approach. There were only two observations that contradicted lecturers' declarations. Since these two lecturers have completed the questionnaire at the beginning of the semester (week 1), whereas other lecturers have answered the survey at the end of the semester, the difference between envisaged and adopted teaching approaches might be caused by the fact that questionnaire has been filled out at two different moments. Further observation is required to investigate this phenomenon to know whether it is a bias, or it reflects reality. Despite this fact, this work highlights that there is a relationship between declared and observed teaching approach to students' self-direction. But, it is not the only element that can foster students' self-direction. Our results also indicate that a student-centered blended learning environment that uses communication tools, like a Forum or an active blended learning environment, in which a flipped classroom scenario is implemented, facilitates the development of students' self-direction. The result of this work may provide the basis for further research in mentoring strategies in blended learning contexts. Since

human mentoring is one of the important elements of blended learning, and this element is related to teachers' conception of teaching or their teaching approaches, our future work will focus on the design of a mentoring model in which each blended learning environment can be represented.

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