

ONE MONTH BEFORE THE PANDEMIC: STUDENTS' PREFERENCES FOR FLEXIBLE LEARNING AND WHAT WE CAN LEARN

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Abstract

Flexible learning has been associated with e-learning, even before the COVID-19 pandemic. Flexible learning gives the students large degrees of freedom to learn what, when, how and where they want. The aim of this study was to evaluate students' preferences in e-learning and traditional classroom teaching, and was conducted from October 2019 to January 2020. Students from four courses were assigned randomly to two groups, an online and a classroom group. The study included two phases: three lectures by the lecturer (podcasts vs. classroom) and seven classroom units with student presentations and discussions. Performance and different personal characteristics and attitudes of 93 students were examined. Knowledge on the course topic was measured before the first lecture took place (t1), after the three lectures (t2) and after the following seven units (t3). Statistical analyses found no performance differences between the two groups (online/classroom); this held true for all three points in time. All students appreciated the opportunity of an intermediate exam at t2 (a change in comparison to former courses on the topic). Qualitative data showed that students felt a need for interaction with their colleagues and the lecturer, which they decided could be better fulfilled in the classroom, whereas the flexible learning setting had advantages for the exam preparation (e.g. repeating listening to the podcasts, taking breaks and learning tempo). Students' arguments fit well to previous literature. Altogether, the study gives valuable insights into the didactic design of flexible learning.

Keywords: *Flexible learning, pre-COVID-19, performance, advantages.*

1. Introduction

Flexible learning gives students large degrees of freedom to learn what, when, how and where they want (e.g. van de Brande, 1993; Wanner & Palmer, 2015). Although flexible learning might be also implemented in traditional classroom settings, it is primarily implemented and associated with e-learning (Li & Wong, 2018). Since its implementation is time-consuming, lecturers should wisely implement changes in their didactics and ensure that they meet students' needs (Feldhammer-Kahr et al., 2019) but still foster achievement of learning targets.

Accordingly, the aim of this study was to evaluate students' preferences in e-learning and traditional classroom teaching. This study was conducted from October 2019 to January 2020, which was right before the COVID-19 pandemic disrupted education in spring 2021, when government-imposed lockdowns and campus closures forced teachers and their students to change to online-learning, thus offering new chances for flexible learning. This study gives valuable insights into the didactic design of flexible learning and student perceptions of flexible learning right before their experiences in the COVID-19 pandemic.

2. Method

This study was conducted in four parallel courses on "Psychological Diagnostics" at the University of Graz, Austria. The students were assigned randomly to two groups, an e-learning and a classroom group, to prevent pre-selection due to preferences. Of the 101 students enrolled in the courses, eight students opted not to participate in the present study, hence the sample consists of 93 Bachelor students of Psychology. The e-learning group included 49 students, 14 males (28.6%) and 35 females (71.4%) from 20 to 31 years (M=22.31, SD=1.96). The classroom group consisted of 44 students nine

males (20.5%) and 35 females (79.5%) from 20 to 26 years ($M= 21.93$, $SD=1.47$). Participation was entirely voluntary and in accordance with the ethical standards of the institutional research committee, where the study design was reviewed and approved. Informed consent was obtained from all participants of the study. Students were able to drop out of the study at any point, which allowed students assigned to the e-learning group also to change back to the classroom group. However, none of the students dropped out during the study.

In the first lecture the students received an overview of the course topics, were introduced into the study design, and were finally randomly assigned into the e-learning and classroom group. Over the following three weeks, the classroom group would attend class to the scheduled dates, whereas the e-learning group could make their own time management, and learn when and where they would prefer using visual podcasts and the PowerPoint slides, which were provided by the scheduled course time via Moodle. While the classroom group could ask questions during class, the e-learning group was provided with a forum in Moodle. During these three weeks the lecturer introduced several topics (e.g. quality criteria of psychological tests). After the three weeks were over, all students attended class to the scheduled dates until the end of the semester, which consisted out of seven interactive classes focusing on student presentations and discussions. The students were instructed not to communicate with students from the other group (either e-learning or classroom) about the ongoing course.

As general prerequisite for this course, all students had attended a basic course on “Psychological Testing” in previous semesters, and therefore were expected to have some basic knowledge. Therefore, in the first lecture the students received a first knowledge test (t1). The performance in knowledge was furthermore measured with multiple choice tests after the three weeks in separate e-learning and classroom groups (t2), as well as after the final seven classes (t3). The exams (knowledge tests) were executed in the classrooms in paper and pencil form, with all students attending.

Furthermore, at t1 fluid intelligence was measured with a matrices test from the Intelligence Structure Battery (Arendasy et al., 2004) was applied. A questionnaire for flexible learning (Feldhammer-Kahr et al., 2019) was used at all three measurement points, as well as eight questions to the preferences of learning activities (e.g. rehearse and exercise or elaborate learning information) and three questions on the importance of personal contact to the lecture (communication in the classroom, receiving feedback, asking questions and discussion). At the end the evaluation (t3) the students were also asked if they would prefer to attend such a class with flexible learning in the future and if there should be more seminars like this.

Open questions were asked as well. After the three weeks of separate e-learning and classroom groups (t2) the students were asked, whether they would have preferred being in the other (e-learning or classroom) group or their assigned group and why. At t3, the e-learning group was asked what they, now after having attended class at the scheduled dates for nine weeks, liked and disliked in both scenarios, if they participated in group discussions, and if they liked or disliked the knowledge evaluations during semester, which was a change in comparison to former courses on the topic.

Self-generated identification codes were used to link individual student answers from the three measurement points. The obtained data was digitalized and later analyzed using IBM SPSS Statistics.

3. Results

In the following section we give an overview of selected first results from our study, focusing on course performance, course design and communication preferences.

3.1. Performance in knowledge tests

A mixed between-within subjects' analysis of variance was conducted to assess the impact of two teaching forms (conventional classroom and e-learning) on participants' psychological diagnostics knowledge (at the beginning of the semester, after three sessions in different groups, end of semester). Although the assumption of normal distribution was violated, with the sample size larger than 30 per group, the violation should not cause any major problems, since the other assumptions are fulfilled (see Tabachnick & Fidell, 2014 for discussion).

There was no significant interaction between group and time, and no significant main effect of the control variable fluid intelligence. The main effect comparing the two teaching forms (classroom and e-learning) was not significant (see Table 1), suggesting no difference in the effectiveness of the two teaching approaches. However, there was a substantial main effect for time (see Table 1 and Figure 1). As could be expected, the knowledge of the students in psychological diagnostics increased over the semester.

Table 1. Results of variance analysis examining the performance in knowledge tests of the two teaching forms.

Knowledge	e-learning		classroom		ANOVA			
	M	SD	M	SD	Effect	F _{ratio}	df	η^2 partial
t1	11.55	2.69	11.52	2.77	G	1.53	1	.02
t2	14.67	2.53	15.34	2.81	T	38.41**	1.94	.30
t3	18.02	1.92	18.18	1.92	GxT	.57	1.94	.01
fluid intelligence ¹	6.55	2.46	5.73	2.33	CxT	1.96	1.94	.02

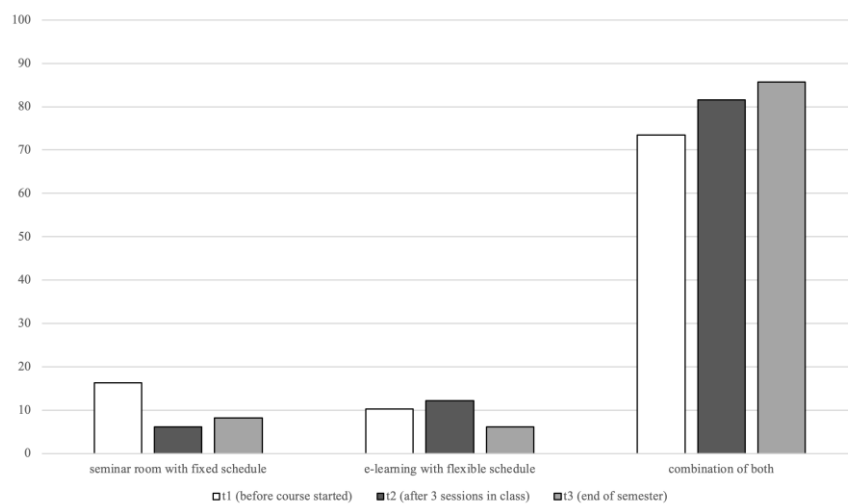
Note. N = 93. t1 = beginning of the semester, t2 = after three sessions, t3 = at the end of the semester; ANOVA = analysis of variance; Knowledge Score Min = 0, Max = 20; ¹Matrices Score Min = 0, Max = 10; G = group; T = time; ¹ C = covariate. * p < .05. ** p < .01, Greenhouse-Geisser adjustment.

3.2. Preferences of course design

We were further interested if the preferences of course design changed in the two groups over time and if differences between the two groups could be found, considering the classroom group never experienced e-learning in the course, whereas the e-learning group had three weeks of flexible online learning. For each measurement time point a Chi-square was conducted. The Chi-Square test showed no significant differences between the group and the preferences at the three measurement points (before the course started: $\chi^2(2, n = 93) = 1.21, p = .55, \phi = .11$; after 3 sessions in class: $\chi^2(2, n = 93) = 4.63, p = .10, \phi = .22$; end of semester: $\chi^2(2, n = 93) = 4.20, p = .12, \phi = .21$).

However, taking a look at the figures we can see a small shift in the preferences. In the e-learning group the number of students preferring a combination of classroom sessions with fixed schedule and e-learning with a flexible schedule increased over time (combination of both t1: 73.5%, t2: 81.6%, t3: 85.7%). The preference for the classroom with fixed schedule however decreased from measurement point 1 (16.3%) to measurement point 2 (6.1%) and increased slightly to measurement point 3 (8.2%). The preference for e-learning with flexible schedule increased slightly from measurement time point 1 (10.2%) to 2 (12.2%) and decreased at the end of the semester (6.1%), when the students had experienced the classroom situation as well (see Figure 2).

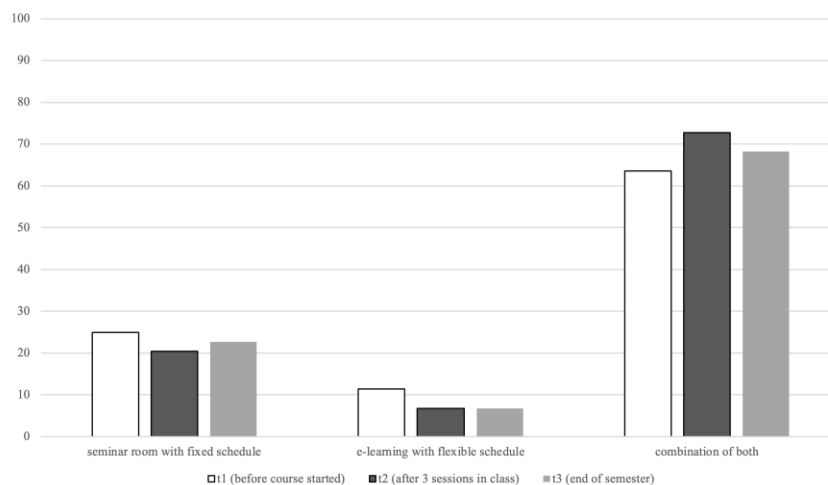
Figure 2. Preferences of the e-learning group (percentage within measurement time points).



Although the classroom group showed shifts in their preferences, they were not standing out as those from the e-learning group (see Figure 3). Interestingly, the preference for e-learning with flexible schedule decreased from the beginning before the seminar started (11.4%) to the measurement time point 2 and 3 (each 6.8%). We can see a decrease in the preference for classroom with fixed schedule from measurement point 1 (25.0%) to measurement point 2 (22.5%) and an increase to measurement point 3 (22.7%).

Similar to the e-learning group the preference for a combination of both increased over the period of time but had a slight drop from the measurement point 2 to 3 (t1: 63.6%, t2: 72.7% and t3: 68.2%).

Figure 3. Preferences of the classroom group (percentage within measurement time points).



3.3. The importance of communication with personal contact

A mixed between-within subjects’ analysis of variance was conducted to assess the impact of two teaching forms (conventional classroom and e-learning) on participants’ perception of the importance of communication with the university lecturer in the classroom (at the beginning of the semester, after three sessions in different groups, end of semester). Although the assumption of normal distribution was violated, the violation should not cause any major problems as the other assumptions are fulfilled.

There was no significant interaction between group and time. The main effect comparing the two types of teaching forms (conventional and e-learning) was not significant, (see Table 2) suggesting no difference in the assessment of the importance of communication with the lecturer in the classroom. However, there was a substantial main effect for time. The students of both groups rated the importance of the communication after the three-week intervention period significantly lower, than at the beginning and the end of the semester.

Table 2. Results of variance analysis of the importance of communication with personal contact in a classroom.

communication	e-learning		classroom		Effect	ANOVA		
	M	SD	M	SD		F _{ratio}	df	η^2 partial
t1	2.00	.76	1.98	.76	G	.04	1	.000
t2	1.80	.82	1.84	.89	T	3.17*	1.95	.034
t3	1.96	.73	2.02	.76	GxT	.17	1.95	.002

Note. N = 93. t1 = beginning of the semester, t2 = after three sessions, t3 = at the end of the semester; ANOVA = analysis of variance; Communication Min = 0, Max = 3; G = group; T = time; * p < .05. ** p < .01.

4. Discussion

Our results show that there are no differences in the learning outcomes between students attending lectures with the same learning content over three weeks in conventional classroom and e-learning with flexible schedule. This indicates that flexible learning implemented through e-learning can lead to the same learning outcomes as traditional classroom settings, if the learning information itself is provided to both groups in the same way (e.g., concerning the format as text or characteristics such as structure and clarity). However, the results also show that the majority of students preferred a combination of both teaching approaches. For students attending the e-learning group it is remarkable that their preferences for a combination of classroom and e-learning grew steadily, while the percentage of these students preferring only e-learning dropped after they returned back to classroom. These results go along with previous surveys among students, that also found a preference for a combination of classroom and e-learning (McShane et al., 2007; Feldhammer-Kahr et al., 2019). Considering our study design, where the e-learning group attended the input-focused classes online while attending the final discussion-focused classes in person, this also supports positive student perceptions of *flipped classrooms*, where e-learning is used for inputs and classrooms for exercises and discussions (Milman, 2012; Wanner & Palmer, 2015). That the students in the e-learning group also perceived personal communication as similarly important as the classroom group shows that lecturers should also include means of personal communication in their e-learning settings, e.g. through live online sessions to discuss

content or ask questions. Such approaches might also benefit from the investment of institutions in tools for online teaching during the COVID-19 pandemic.

The students' need for interaction with their colleagues and the lecturer was also mentioned in the comments of the qualitative data. Students felt that interaction could be better fulfilled in the classroom. As one student described it: "I can learn more efficient if the lecturer is present. It is possible to ask questions right away if there are difficulties in understanding the lecture". Students in the e-learning group also frequently reported about difficulties with procrastination, an issue that was already described in previous studies on e-learning with flexible schedule (e.g. Barnard et al., 2009; Dreisiebner et al., 2020; Luttenberger et al., 2017). Students found that a combination of e-learning and regular classes could help them to overcome procrastination: "As I am typically procrastinating a combination would be helpful, but more time consuming". But students also found flexible learning as particularly helpful for the exam preparation. As one student described his experience: "I had the possibility to re-watch certain sequences before the exam, had enough information for exam preparation, and could learn at whatever speed and time I wanted".

This research comes with several limitations, which in turn provide avenues for future research: First, the sample consists only out of Bachelor students of Psychology at a single tertiary education institution. Student preferences might also be also influenced by factors like cultural background, experience, and discipline (Denman-Maier, 2004; Dreisiebner et al., 2020). Second, although students were instructed not to exchange their experiences between e-learning and classroom group during the study, it cannot be ruled out that the students communicated, thus also influencing the perception by the groups. Further work is needed to examine which factors influenced the student perceptions. As there was a slight drop in preference for classroom teaching with fixed schedule for the classroom group at t2 this might have been also influenced by the experience of having to attend classes while half of the classroom remained empty due to the missing students of the e-learning group. Third, the e-learning section of this course was relatively short, with only three out of eight classes. The reason for this is due to the institutional regulations at the time of the study not allowing a higher share of e-learning in courses. Further studies might also examine if student perceptions change in case of higher amount of experience with e-learning with flexible schedule, particularly after the students' experiences with e-learning during the COVID-19 pandemic.

References

- Arendasy, M., Hornke, L. F., Sommer, M., Häusler, J., Wagner-Menghin, M. (2004). *Intelligenz-Struktur-Batterie [Intelligence-structure-battery]*. Mödling: Schuhfried GmbH.
- Barnard, L., Lan, W. Y., To, Y. M., Paton, V. O., & Lai, S.-L. (2009). Measuring self-regulation in online and blended learning environments, *The Internet and Higher Education*, 12(1), 1-6. doi:10.1016/j.iheduc.2008.10.005
- Denman-Maier, E. (2004). Intercultural factors in web-based training systems. *Journal of Universal Computer Science*, 10(1), 90-104.
- Dreisiebner, S., Polzer, A. K., Robinson, L., Libbrecht, P., Boté-Vericad, J.-J., Urbano, C., Mandl, T., Vilar, P., Žumer, M., Juric, M., Pehar, F., & Stričević, I. (2020). Facilitation of information literacy through a multilingual MOOC considering cultural aspects, *Journal of Documentation, ahead-of-print*. doi:10.1108/JD-06-2020-0099
- Feldhammer-Kahr, M., Dreisiebner, S., Paechter, M., Sommer, M., & Arendasy, M. (2019). Evaluierung des flexiblen Lernbedarfs bei Studierenden – Implikationen für die Praxis [Evaluation of flexible learning needs among students – Implications for practice]. *Zeitschrift für Hochschulentwicklung*, 14(3), 19–40. doi:10.3217/zfhe-14-03/02
- Li, K. C. & Wong, B. Y. Y. (2018). Revisiting the Definitions and Implementation of Flexible Learning. K. C. Li, K. S. Yuen & B. T. M. Wong (Eds.), *Innovations in Open and Flexible Education* (3-13). Singapore: Springer.
- Luttenberger, S., Macher, D., Maidl, V., Rominger, C., Aydin, N., & Paechter, M. (2017). Different patterns of university students' integration of lecture podcasts, learning materials, and lecture attendance in a psychology course. *Education and Information Technology*, 23, 165-178 (2018). doi:10.1007/s10639-017-9592-3
- McShane, K., Peat, M., & Masters, A. F. (2007). Playing it safe? Students' study preferences in a flexible chemistry module, *Australian Journal of Education in Chemistry*, 67, 24-30.
- Milman, N. (2012). The Flipped Classroom Strategy. What Is it and How Can it Best be Used?, *Distance Learning*, 9(3), 85-87.
- Van den Brande, L. (1993). *Flexible and distance learning*. Chichester: Wiley.
- Wanner, T., & Palmer, E. (2015). Personalising learning: Exploring student and teachers perceptions about flexible learning and assessment in flipped university course. *Computers and Education*, 88, 354-369. doi:10.1016/j.compedu.2015.07.008