

BLENDED EDUCATION IN FOOD AND HEALTH (HOME ECONOMICS): DO WE NEED CAMPUS?

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Abstract: *Blended education, or on-line education in combination with face-to-face education, is becoming more relevant in postsecondary education. The University of Agder offers blended education in food and health. In this study, we explored the advantages and disadvantages of providing blended education in food and health compared to providing on-campus education. The study focused on differences in student satisfaction for practical and theoretical education, as well as ICT and administrative support. Questionnaires were sent to students enrolled in two blended food and health education courses and to students enrolled in two on-campus courses. In-depth interviews were conducted with randomly selected students. Student evaluations and final reports for the different groups were studied. The findings indicated that both groups had high satisfaction scores for the theoretical and practical lectures. Students in blended learning courses indicated higher satisfaction for theoretical lectures and ICT and administrative support, but not for practical skills teaching.*

Keywords: blended learning, satisfaction, food and health, home economics, teacher education, practical skills.

Introduction

Personal computers, internet, smartphones, and other forms of communications technology (ICT) have changed our world. Our personal lives and jobs, and the way we manage our knowledge and time efficiently and effectively also have changed. We can communicate with colleagues and friends all over the world through e-mail and teleconferencing. It is possible to study from our dining room tables and use the e-library for research purposes. Because of the ICT development, blended education is becoming more relevant. New and better technologies provide for more possibilities for on-line education in combination with face-to-face education (i.e., blended learning: Graham, 2013). This combination has the possibility to provide different educational experiences, both outside and inside the classroom (Dziube, Hartman, & Moskal, 2004).

Vo, Zhu, and Diep (2017) completed a

meta-analysis on the effects of blended learning on student course performance in higher education. They divided the students into two categories. The first group was students in the field of Science, Technology, Engineering, and Mathematics (STEM) or hard-disciplines. The second group was students in the non-STEM disciplines described as the soft-disciplines. Even though food and health was not mentioned, we interpret that the division would place it in the non-STEM category. The study showed that blended learning can result in better learning outcomes for higher education students and that the effects of blended learning on student performance in STEM disciplines was significantly higher than that of non-STEM disciplines. Teachers in non-STEM disciplines therefore must pay greater attention to the ways their courses are constructed. This study explored whether it is possible to provide students with good practical education in food and health mainly through an online program.

Sinclair (2011) reviewed 34 papers of student satisfaction to identify determinants recognized as important to students' perception of their learning experiences. He concluded that student satisfaction involves both enjoyable and successful experiences. Wu, Hsia, and Tennyson (2011) define learning satisfaction as, "the sum of student feelings and attitudes that results from aggregating all the benefits that a student hopes to receive from interaction with the blended e-learning system" (p. 224). Naaj, Nachouki, and Ankit (2012) consider student satisfaction as an important factor in measuring the quality of blended learning.

In a study at Queensland University of Technology, 23 master students were asked about their blended learning experiences. Students were positive about online learning, but also appreciated the face-to-face interaction with teachers and peers (Waha & Davis, 2014). A literature study on blended learning indicated that teachers continue to play an important role and are not replaced by technology. Teachers still have a central role in learning and course design (Gerbic, 2011).

Pizzi (2014) indicated that it is important that lecturers are familiar with and capable of using the technology. His experience suggested that if instructors spent time preparing for the term well, the term was better organized for both students and staff. He also claimed that students found learning to be fun and interesting when using technology that was familiar to them. In blended learning, the information is readily available and can be repeated whenever the students want. This may increase students' learning outcome. Internet self-efficacy is an important part of online learning (Chang et al., 2014) and helps students transform motivation into learning action.

Sadeghi, Sedaghat, and Sha Ahmadi

(2014) found that students attending a blended learning course were more satisfied than on-campus students. Buchanan and Palmer (2017) compared online courses with face-to-face courses and found that learning outcomes were roughly similar, but that the face-to-face students were more satisfied.

Some negative aspects concerning blended learning also have been discussed by Wu, Hsia, Liao, and Tennyson (2008). They mention lack of peer contact and interaction, high costs for preparing, maintaining, and updating multimedia content and learning materials, as well as the need for flexible tutorial support.

It has been difficult to find relevant research on blended learning in food and health (home economics) or other practical subjects. Thus, it is difficult to compare blended learning outcomes to studies completed in theoretical subjects. Research in this area is just beginning.

Competence in practical skills is very important in food and health. We had many questions when developing the first blended course for teachers in food and health at the University of Agder in 2013-2014. Is it possible to learn this online in combination with a few face-to-face meetings on campus? Do students reach the same level of competence with online education as with on campus learning? Student evaluations, together with discussions with the students, gave us feedback indicating that both student groups are in general satisfied with their educational experiences. However, we needed more information to answer our question: Do students differ in their satisfaction for practical and theoretical education, and ICT and administrative support? The aim of the research is to explore student satisfaction with blended education in food and health compared to on-campus education.

Food and Health in Norway

In 2006, the Ministry of Education and Research introduced a new curriculum plan for all subjects in primary and secondary education in Norway. Home economics was renamed food and health and the focus and content of the subject changed from traditional home economics to food and health. The subject concentrates on food from three different perspectives:

- Food and lifestyle
 - Food and consumption
 - Food and culture
- (Utdanningsdirektoratet, 2011).

In Norway, less than half of the teachers in food and health have education in the subject (Lagerstrøm, Moaf, & Revold, 2014). Only a few universities and university colleges in Norway offer education in food and health. Many teachers have difficulties in coming to campus to take further education because of family commitments, economic constraints, and long distances. Blended learning opens up possibilities for more teachers to engage in further education in food and health.

Method

Food and Health at the University of Agder

The University of Agder offers on-campus courses in food and health to teacher education students in the fourth year of their education. The students can choose between courses over one or two terms, earning either 30 or 60 ECTS (European Credit Transfer System). In addition, the university offers part-time, blended food and health courses (30 or 60 ECTS) over two or four terms.

Participants

On-Campus Students. The students who completed food and health courses (30 ECTS) on campus received two days with four lectures of practical work in the kitchen and six theory and didactic lectures every week for one term. In addition, they did practical teaching in schools one day per week. Both the practical work in the kitchen and the practical teaching in schools had 100% compulsory attendance as practical skills and practical teaching are learned best through live practice. The on-campus students were mainly students who had completed all of their education in Norway. Over 90% of the campus students were in their twenties.

Blended Learning Students. The blended learning students received two lectures online every week (*Adobe Connect*), and came to campus for face-to-face sessions over three days twice per term. All the on-line lectures were recorded, and it was possible to repeat the lectures several times. Students received 30 ECTS over two terms. The blended learning students had the same number of projects to hand in as the on-campus students, but their projects were more comprehensive. The majority of these students were immigrants who had completed their education outside of Norway. They lived and worked in Norway between 5-to-25 years and spoke and understood Norwegian. Only 4% of the blended learning students were in their twenties, with almost half being in their forties (46%).

Data Collection

We used two methods to ascertain the value of the students' experiences: (a) a closed-form survey (*SurveyXact*), and (b) in-depth interviews with one student from each course. In addition, we studied student evaluations and final reports from all the courses.

Closed-form Survey. The closed-form survey was sent by email to all students who participated in the blended learning courses held in 2013-14 (total of 5 students) and in 2014-2015 (total of 31 students) and to all students who participated in the on-campus course held in fall 2013 (total of 36 students) and fall 2014 (total of 43 students). A total of 115 students received the questionnaire, with 66 responding (57%). The response rates were 69% (25 respondents) from the blended learning course and 52% (41 respondents) from the on-campus course. According to Jacobsen (2010), the response rate was satisfactory.

The questionnaire included demographic questions about age, work, domicile and study program, with students' responses being anonymous. The respondents also were asked how satisfied they were with the practical and theoretical lectures, and how satisfied they were with ICT and administrative support. For these three questions a 7-point Likert scale was used, where 1 indicated complete disagreement, and 7 indicated complete agreement. There also was an option to answer, "Don't know/No experience." These responses were reported as missing in the analyses. In this way, the respondents indicated what level they agreed or disagreed with the statements (Befring, 2007).

All statistics were performed using *SPSS Version 23.0*. As the data was not a normal distribution, non-parametric analyses were used. We compared participants' satisfaction scores between the two groups using the Mann-Whitney *U* test (Nachar, 2008). Descriptive statistics included median and interquartile scores. The statistical significant level was $p < 0.05$.

In-depth Interviews. To gain a deeper understanding of the value of food and health in teacher education as well as possible course improvements, we conducted an in-depth interview with one

student from each of the four groups. The students were selected randomly. One interview took place face-to-face, the other three by *Skype for Business* (online). The interviews lasted for approximately 30 minutes and were audio recorded. Information relevant for the research study was extracted from the interviews.

The interview started with an open question about the advantages and disadvantages in offering food and health in teacher education. The in-depth interview was based on students' responses to the questionnaire, with students asked to elaborate their responses further.

Evaluations and Final Reports. As part of mandatory mid-term and final evaluations, the students were given a list of questions to discuss without the lecturer present. The questions were the same for all courses and covered infrastructure, ICT-support, course content, and instructor performance. The class representative wrote a summary after the discussion and conveyed students' opinions to the lecturer. After each term, the lecturer wrote a final report based on the students' evaluation, and published it on the university's learning platform.

Results

Questionnaire

Information on students' satisfaction scores for practical and theoretical lectures as well as ICT and administrative support are listed in Table 1. Two of the participants (on-campus students) did not answer any of the three questions. Eleven of the on-campus students answered, "Don't know / No experience" for the last question, with their responses recorded as missing.

Both groups of students were generally satisfied with the practical and theoretical lectures and ICT and administrative support (Table 1). The satisfaction scores

for the practical lecture did not differ between blended learning (Mdn = 7) and on-campus learning (Mdn = 6), $U = 390$, $p = 0.139$. Students in the blended learning had significantly higher satisfaction scores for the theoretical lectures (Mdn = 6), than the on-campus students (Mdn = 5), $U =$

260.5, $p = 0.001$. The blended learning students had significantly higher satisfaction scores for the ICT and administrative support (Mdn = 5), than the on-campus students (Mdn = 4), $U = 190$, $p = 0.003$.

Table 1
Median Satisfaction Scores for Practical Lecture, Theoretical Lectures, and ICT and Administrative Support

	N1	N2	Blended Learning Mdn (Q1, Q3)	On-campus Learning Mdn (Q1, Q3)	p
Practical Learning	25	39*	7 (6, 7)	6 (6, 7)	0.139
Theoretical Learning	25	39*	6 (5, 7)	5 (5, 6)	0.001
ICT & Administrative Support	25	28**	5 (4, 6)	4 (3, 4)	0.003

Notes. N1=Blended learning, N2=On-campus Learning *Two of the on-campus students did not complete the survey. ** Eleven of the on-campus students answered, “Don’t know / No experience” on the ICT and Administrative Support question, with their responses reported as missing. Mdn=Median, Q1=25th Percentile, Q3 =75th Percentile

In-depth Interviews

In the in-depth interview with the blended learning students, both respondents commented that it was useful to be able to watch the theoretical lectures several times. This was especially useful for the blended learning students for whom Norwegian was a subsequent language. They also pointed out that screen recording, as feedback on written projects, was a very good way of receiving feedback. Students indicated that it felt like receiving direct or face-to-face feedback.

The blended learning students made it clear that blended learning was a better alternative for them than studying on campus, but that it is still essential with face-to-face lectures in a subject like food and health.

Days on campus are important for sharing knowledge and experiences, and especially

for gaining practical skills. The practical projects at home also contributed to improved practical skills. Students indicated that they would like more videos showing different practical procedures. While it is not necessary to present traditional theoretical teachings during campus gatherings, it was important that on-campus gatherings provided an arena for questions, processing theory, and summarizing information posted on the learning platform. The students claimed that the course provided them with sufficient knowledge and practical skills to teach the subject.

The two on-campus students held differing opinions about the course. One student felt that the amount of theory was too low, and also believed that blended learning students should have a higher level of practical skills when starting the course than the on-campus students. This student would prefer to complete the on-campus

course, especially because of greater time used for practical skills training. The other student was satisfied with the level of practical and theoretical lectures. Students believed that the course provided a very good basis for teaching food and health.

Course Evaluations & Final Reports

In the course evaluations, blended learning courses using *Adobe Connect* in real time and with recording were emphasized as very good. Although the students followed the lecture in real time, they requested that it should be recorded so that they could repeat it whenever they liked. They also commented that on-line lectures that began with a reflective question, where the students could think and reflect about the question and provide their comments on the lecture log, was a good way to start a lecture.

The students also proposed that the first face-to-face meeting at the university should take place before the on-line lectures began. Any student, who is not familiar with on-line learning, could then receive necessary help. The students came from different parts of the country, and they commented that exchanging experiences during the day at the university was very valuable and educational.

Practical projects were seen as central. The lecturers also regarded this as important, because the blended learning students received little experience in the university's teaching kitchens. If students were unable to attend one gathering on campus, they lost 50% of the practical lectures for the term. Even though they need to complete the same tasks at home, they may be disadvantaged in terms of acquiring critical skills, and receiving instructional feedback and insights. Not acquiring critical skills is a vulnerable situation.

Discussion & Conclusions

All students in the study had very high satisfaction scores for the theoretical and practical lectures. The blended learning students reported a significantly higher satisfaction score for the theoretical teaching than did the on-campus students. Both groups of students reported higher than average satisfaction with ICT and administrative support, with the blended learning students having a significantly higher score than their on-campus peers. In general, the blended learning students seemed to be more satisfied than the campus students. This difference may stem from differences between the groups as age and cultural differences might influence self-reported satisfaction.

Practical Skills

Little research has been done investigating practical skills and blended learning. The blended learning students in our study expressed that they were satisfied even though they received considerably less teaching of practical skills. There may be several reasons for this. Many of the students were mature students and had more experience with practical skills and teaching. The fact that the students were satisfied however does not mean that they gained high or sufficient competence. They often expressed that they understood, however, there were some language challenges. In the in-depth interviews, the blended learning students expressed a wish for more videos showing practical procedures. As teachers in a non-STEM discipline, we must pay more attention to the way the course is constructed in order to provide the students with good practical skills (Vo et al., 2017).

Theoretical Skills

Blended learning students were significantly more satisfied with the theoretical teaching than were the on-

campus students. The reason for this may be that the lectures were recorded so that they could watch them several times. This coincides with the findings of Pizzi (2014) and the results from the in-depth interviews. Gatherings at the university were important for processing theory. The students preferred more active work methods and discussions with fellow students and lecturers.

Strengths and Limitations

We collected data in three different ways, and at different times: closed-form survey in-depth interviews, and course evaluations and final reports. This may be a potential strength of the study as the participants had the chance to reflect on the course several times.

The study also has some limitations. The groups were small, ranging from 5-43 students, and differed in age, cultural, and linguistic backgrounds. This may have influenced the results. In-depth interviews could have been conducted with more than one person from each group.

Further Research

All students in the study had very high satisfaction scores for the theoretical and practical lectures. The blended learning

students reported a significantly higher satisfaction score on the theoretical lectures than the on-campus students. Both groups of students demonstrated above average satisfaction with ICT and administrative support, with the blended learning students having significantly higher scores than their peers.

Not much research has been done in this field, especially within food and health. The experience gained from two years of blended learning can be used in the development of new courses. The students suggested that practical procedures should be filmed. Introductory films of practical procedures and methods should be produced for blended learning courses. These films can also be used for on-campus students who can watch them to refresh procedures that they have tried in the kitchen.

There is a great need for more research on blended learning both in food and health and in other practical studies in higher education. Further research is needed to explore the levels of competency that blended learning students acquire in practical skills. The results from this study indicate that blended learning in food and health is possible, but we still need campus.

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