

With the Aim of Multi-directed and Work-integrated Professional Development

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Abstract: In a time when most countries are facing a rapidly emerging knowledge society, the investment in human resources is essential for companies and organisations. In parallel, technology enhanced learning has enabled more flexible forms of professional development with work-integrated learning, an interesting shift that also challenges the traditional university model. An interesting concept for realising the work-integrated learning principle of solving practical problems in the industry, is the offer to participants and companies to 'Bring Your Own Data' (BYOD). This case history is based on the BUFFL project, where the acronym BUFFL could be translated from Swedish to English as 'Industry development at bank and insurance companies through flexible lifelong learning'. A case story that involves several aspects of knowledge management such as how theories from the university could be applied to data provided by companies and organisations. The BUFFL project is a cross-disciplinary collaboration between six companies, three universities, and researchers from different university departments. The aim of this study is to present, analyse and discuss the design and implementation of a pilot project for a technology enhanced and multi-directed lifelong professional development. The main research question to answer was: "What are the bank and insurance company staff perceptions of the BUFFL project design of technology enhanced professional development, and the idea of bringing their own data to course activities?". Data for a preliminary project evaluation have been gathered by course evaluation questionnaires from 14 instances of 9 course modules. Questionnaires comprised 30 questions with a mix of Likert-scale questions and questions with open-ended free-text answers. With the aim of finding data that have a potential to answer the research question 10 Likert-scale questions and 4 free-text questions were selected. Results from the Likert-scale questions were presented as a descriptive statistical analysis that discusses frequency, central tendency and variation. Open-ended free-text answers have been categorised in a deductive thematic analysis and compared to the results from the Likert-scale questions. The study was conducted entirely in Swedish with questions and answers translated to English by the author. Findings indicate that a technology enhanced and workplace integrated course design is appreciated by the participants, when information and communication technologies work. On the other hand, technology incidents have caused irritation and the provisional support model needs a further development that also could survive the project span. The complaints on too theoretical course literature, and that course design lacks adaption to the participants' actual workplace situations are contradicted by the result of the quantitative analysis. However, the course design would need redesign to better match the conditions for full-time working participants.

Keywords: Professional development, Technology enhanced learning, Work-integrated learning, Bring your own data, Multi-directed universities

1. Introduction

In the 21st century with the ongoing shift to a knowledge society, the investment in human resources and lifelong learning are essential activities for companies and organisations (Baporikar, 2016). Bridgstock, 2017). The Corona pandemic has further emphasised the importance of technology enhanced learning in higher education and professional development (Mozelius, 2020). Regarding work-integrated learning in the 21st century, technology enhancement is a facilitating core component (Bohn et al., 2017; Matheos & Cleveland-Innes, 2018). In the BUFFL project that this case history and project evaluation is based on, technology enhancement has been a fundamental design component to support the idea of anytime and anywhere. Important to increase the flexibility for full-time working adult learners, and to challenge the traditional university model for professional development. The project acronym BUFFL could be translated from Swedish to English as 'Industry development at bank and insurance companies through flexible lifelong learning'. Moreover, this case store involves aspects of knowledge management (KM) that are interesting for readers of a KM journal. One aspect is the collaboration between academia and industry and how to facilitate for a fruitful meeting between tools and theories from the university and real-world problems from the workplace. Another aspect is the creation of new knowledge from group collaboration around company brought data, and that knowledge creation in one course batch could be passed on to another for further refinement and organisational development.

Like many other universities, Mid Sweden University has initiated a discussion on the future role of professional development and work-integrated learning. Another ongoing discussion at Mid Sweden University is how to take a leading role in the further development of technology enhanced learning. In a time when the average age of Swedish students has decreased significantly during the last decades, the university has strived to increase the

engagement in lifelong and work-integrated learning. This suggested shift requires a tailored pedagogy as well as an extended technical support. These challenges have contributed to the aim of a flexible, technology enhanced, and multi-directed lifelong professional development in the BUFL project (Jaldemark & Öhman, 2020).

Another fundamental design principle in the BUFL project has been the concept of course participants bringing their own data (BYOD) from their workplaces into course activities and assignments. The described BYOD concept has the multiple purpose of building a foundation for assignments based on real-world problems in courses, and to support organisational development in a more long-term perspective. The data brought that have been analysed and processed in a course module. could later preferably be passed on to other participants from the same organisation in other course modules. From a pedagogical perspective, the BYOD concept helps to build a foundation for contextualised learning with assignments that uses authentic data. (Jaldemark & Öhman, 2020).

The early informal feedback from course participants has mostly been positive, but also with some complaints about course design and technology issues (Mozelius et al., 2020b). This study is a part of a more systematic evaluation of the BUFL project that is carried out during 2020 to 2022. Data have been collected from course evaluation questionnaires, by a selection of a subset of questions and answers that have a potential to meet the aim, and to answer the research question. The aim of the study is to present, analyse and discuss the design and implementation of the BUFL project concept of a technology enhanced and multi-directed lifelong professional development. The main research question to answer was: *"To what extent did the project achieve its objective, and how did the BYOD concept contribute to this?"*

2. Theoretical background

There are several theoretical perspectives that have inspired the overall design of the BUFL project. Some of them will be evaluated in separate studies later on, and be led by researchers with special competencies in the various theoretical fields. The choice for this study was to have a three-fold focus on 1) Technology enhanced learning, 2) Work-integrated learning and 3) The idea of bringing your own data.

2.1 Technology enhanced learning

The advances in sophisticated information and communication technology (ICT) in the 21st century has made an impact in many areas, and the transition of higher education is obvious (Daniela et al., 2018, Shen & Ho, 2020). Technology enhanced learning (TEL) has been implemented in various ways and with different pedagogical models. As pointed out by Habib and Johannesen (2020) the variations are so huge, that it is difficult to say anything generic about the effects of TEL on learning or learner satisfaction. Almost all universities today use TEL in some type of blended learning, where blended learning can be depicted as in Figure 1 below. This model by Picciano (2009), with the two axes of face-to-face versus online teaching and learning, and basic online technology versus rich media tools on the other. Examples of rich media are digital simulations, videoconferencing and virtual online labs.

The blend on the X-axis is straightforward and easy to understand, the left endpoint is traditional classroom activities only, which could be blended with online activities, or completely shifted online. On the Y-axis the upper right corner could be explained as asynchronous teaching and learning activities online, to be compared with the synchronous online activities in the lower right corner. Synchronous online activities like seminars and group exercises requires more advanced technology such as videoconferencing tools. Finally, the upper left low-tech corner has its counterpoint in the lower left corner with activities that are based on the use of advanced digital offline technology.

In the BUFL project, the horizontal dimension was initially planned for a few exceptions of blending with conventional activities. Later during the pandemic, this shifted to fully online. Regarding the vertical aspect the course design involves videoconferencing with synchronous teaching and learning activities, and streaming of recorded lectures in the virtual learning platform. However, as pointed out by Picciano (2009), technology can be used to support innovative didactics and instructional design, but all resources do not necessarily have to be used all the time. As highlighted in a study by Daniela et al. (2018), teaching and learning activities can benefit from the use of technology, but at the same time new challenges will emerge.

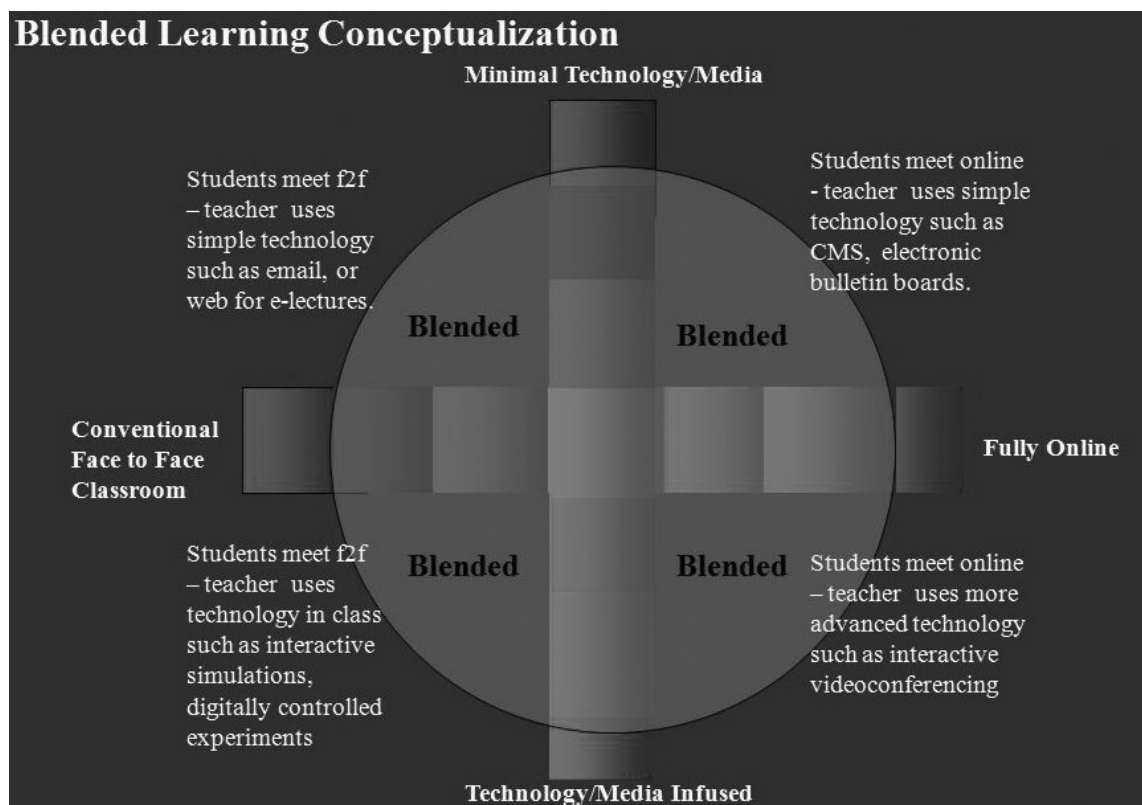


Figure 1: A conceptualisation of Blended Learning (Picciano, 2009, p. 7)

Three identified challenges in the creation of added value in TEL initiatives are A) Teachers' and instructors' ICT-literacy and competence to use technology to ensure effective learning, B) Students' skills for interaction and construction of knowledge in TEL environments, and C) Sustainability in TEL based initiatives (Daniela et al., 2018). These challenges do not always have obvious solutions, and all have sub-challenges. Firstly, teachers and facilitators often perceive that learning to use new technology increases their workload and thus making the accomplishment of their objectives more difficult instead of the facilitating teaching and stimulating learning (Adekola, Dale & Gardiner, 2017; Mozellus & Rydell, 2017). Secondly, research studies indicate that learners' self-evaluation of their digital skills is higher than their actual digital skills (Olson & Clough, 2001; Černočová et al., 2020). Finally, as highlighted by Daniela et al. (2018), the human factor is important for sustainable education, and that TEL initiatives' sustainability depends on the same factors as sustainability in general: economy, environment and society.

2.2 Work-integrated learning

To invest in human resources by a continuous and lifelong professional development is essential in the 21st century knowledge society. How to achieve this with an integration in workplaces has been discussed, and also highlighted in policy documents. Work-integrated learning (WIL), is in this article used as defined by Patrick et al. (2008, p. iv) *"an umbrella term for a range of approaches and strategies that integrate theory with the practice of work within a purposefully designed curriculum"*. WIL should also be profitable and make a positive impact, both for universities and for the involved companies and organisations. Today, the vast majority of WIL collaborations are technology enhanced and located online to realise the idea of learning anytime and anywhere. From the learner perspective, the technology enhancement enables more individualised study schedules with continuous distance support from qualified instructors (Gordon, 2014). From the teacher perspective, online learning enables the use of interactive multi-modal tools, and more flexible teaching activities. These activities can be conducted both synchronously and asynchronously, and in collaboration between different workplaces across geographical and organisational boundaries.

WIL recommends having a curriculum design where learners carry out parts of their studies in workplace settings, solving real-world problems are related to the course syllabus. From the university perspective, the responsibility is to provide educational course content that corresponds to the present and future needs of

learners, companies and organisations. Moreover, course content and activities in WIL should be aligned to the aim of increased employability (Smith, 2012), and organisational development (Jaldemark & Öhman, 2020). An important aspect of WIL is to enable learners to participate in authentic real-world activities, with theory and methods from academia applied to practice-based workplace tasks (Ferns, Campbell & Zegwaard, 2014). The described collaboration between academia and industry ought to be further developed in the future, and as suggested by Van Rooijen (2011, p. 5)

"Universities of the future must reach out and invite employers to be integral and equal partners in the educational process, particularly in aligning (not designing) curriculum that has practical, experiential and real world relevance for employees."

The future path of collaboration and engagement should be reciprocal, with the ivory tower universities seen as a concept of the past (Etzkowitz et al., 2000). In the shift from Work-integrated learning to 'Learning-integrated work', the university should be multi-directed, and with interactive knowledge networks in collaboration with the surrounding society (Van Rooijen, 2011). One idea in the BUFFL project for a true alignment between courses and practice-based workplace tasks, is to build activities and assignments upon the concept of Bringing Your Own Data (BYOD). This concept is explained in the next section.

2.3 Bring your own device and your own data

The increasingly popular acronym BYOD can be interpreted in several ways, where two interpretations definitely can contribute to a more agile collaboration between universities and the surrounding society. The most well-known interpretation is 'Bringing Your Own Device', a concept that has facilitated the idea of studying anywhere and at any time. This idea started out in the industry in 2009, when the multi-national company Intel encouraged their employees to bring their own laptops and mobile phones to work. Later the trend of people bringing their own ICT devices spread from companies to educational environments. Students and teachers that brought their own devices opened up new teaching and learning opportunities. At the same time, the wide variety of brought devices created new challenges, and in particular new compatibility and security issues (Afreen 2014; Dhingra, 2016). In most regions today, the majority of students and teachers have own devices to bring, and if the most critical challenges are addressed this concept can add value and renew educational design (Kibar, Gündüz & Akkoyunlu, 2019; Mozelius et al., 2020a). However, this diversity that adds flexibility for learners also creates complexity for teachers when different operating systems and hardware platforms require different versions of software tools.

In this article the focus is on another, and less well-known interpretation of BYOD, to Bring Your Own Data. This concept has previously been tested with promising results in several research workshops (Roos et al., 2014; Carta et al., 2017). To involve learner brought data has been a core concept in the design of BUFFL courses, with the idea of supporting work-integrated learning and organisational development. Building on the idea of contextual learning, course activities should involve authentic problems and workplace tasks, where participants should bring the data. Contextual learning should by definition apply theories to a well-known context to make learning less abstract, and a principle that seems especially important in work-integrated learning (Järvinen & Poikela, 2001). Furthermore, contextual learning should involve new teaching styles and didactic strategies (Davtyan, 2014)

Both the interpretations of the BYOD acronym can support contextual learning, and also new teaching and learning styles. The involvement of authentic data from companies in course activities could certainly involve the heutagogical ideas of self-determination and contextualised learning. Heutagogy has also been identified as a promising complement to technology enhanced and lifelong learning (Blaschke, 2021). Moreover, learner brought data has the potential to strengthen the idea of having assignments based on authentic problems that can lead to organisational development. As always in WIL initiatives, it is important to consider the balance between theory and practice. A general design rule in the BUFFL project is that each course module should include at least one assignment that is related to ideas from the course literature, and one assignment that is built around data brought from involved companies and organisations (Jaldemark & Öhman, 2020).

3. Method

Data were gathered from answers in course evaluation questionnaires, where both the questions and the answers have been translated from Swedish to English by the author. As all other parts of the project evaluation in this study have been conducted in Swedish, with the results published in English. The translation has been

conducted with the aim of keeping the essential meaning as exact as possible. However, some Swedish verbs, nouns and idiomatic expressions cannot be directly translated. Quotes have sometimes been translated with a replacement of some sayings and expressions in spoken Swedish that would not make sense if directly translated into English, but always with the main aim of keeping the essential core meaning. Out of a total of 30 questions, 10 Likert-scale questions and 4 open-ended free-text questions were selected with the common denominator that they have a potential to answer the research question. The majority of the omitted questions concern more traditional pedagogy and details in the university organisation, and are beyond the scope of this study.

Answers to the selected questions were gathered from course evaluation questionnaires from 14 instances of 9 course modules that all have been developed and given as a part of the BUFL project. Answers from all the selected questions have been analysed and discussed together after an initial statistical analysis of the quantitative data, and a separate thematic analysis of the free-text answers. Quantitative data were analysed in a Python script coded by the author, with the use of the Python standard library module 'statistics'. The functions from the statistics module that were used in the analysis were the mean function and the median function (Python statistics, 2021). Qualitative and quantitative data were later compared and categorised together in a thematic analysis according to the Six-step process outlined by Braun and Clarke (2012). The thematic analysis was carried out deductively based on the three categories that are presented in 2. Theoretical background. Answers from the Likert-scale questions have been compared to free-text answers in the corresponding categories to find where answers converge or diverge.

3.1 Likert-scale questions

Ten Likert-scale questions that all were five graded have been selected from the course evaluation questionnaires. The selected questions are all on topics that have a direct alignment to the research question. The ingoing Likert-scale questions are, after a translation by the author, listed here below:

1. How do you evaluate your experience of reading course literature in English?
2. How do you evaluate your earlier experience of reading research articles?
3. How do you perceive the support from your employer for taking this course?
4. How did you perceive the opportunity of bringing your organisation's own data?
5. How did you perceive the course instructions regarding technology?
6. How did you perceive the usability of the virtual learning platform Moodle?
7. How did you perceive the technology regarding Moodle and Zoom?
8. How did you perceive the pace of study (25%) in the course module?
9. How did you perceive the pace of study adaptation to your full-time work?
10. How did you perceive that the course assessment was adapted to the organisation's own data?

3.2 Free-text questions

The four selected free-text questions are also from the course evaluation questionnaires. Free-text questions have been translated by the author as:

1. Are you satisfied with the learning opportunities in the course module? Motivate.
2. Are you satisfied with your own performance in the course module? Motivate.
3. What was especially good when taking the course module? Motivate.
4. What was less good when taking the course module? Motivate

3.3 Ethical considerations

All respondents have been kept as anonymous as possible through the study, and all respondents have contributed on a voluntary basis. Answers to the questionnaire have been submitted anonymously online without any registration of names or personal details. No results were reported separately from course modules with few participants, and the principle has been to only work with the aggregation of questionnaire answers from all course modules. In the translation from Swedish to English, answer details that might reveal the respondents' alignment to a company or a course module have been omitted.

4. The BUFL project

BUFL is a two-year pilot with three phases that partially intersect, and also are repeated on several occasions. The project is outlined to combine work-integrated learning with lifelong learning, with the aim of addressing the increasing demand for continuous professional development. The work in the project was carried out in a collaboration between six private companies and three universities, involving researchers from the Mid Sweden

University departments of Economy, Educational Science and Computer and System Science. The overall project goal has been to develop a framework for needs-based lifelong professional development, built around user-friendly technology enhanced learning. Furthermore, an important foundation in the project is to work with concepts and challenges that origin from the involved organisations and companies. Many course activities and assignments were based on data and problems from the participants actual workplaces, which is a fundamental WIL principle.

As pointed out by Jackson (2015), WIL initiatives must combine practical workplace-based activities with the academic tradition of theoretical studies. This is an important combination to achieve the desired multi-directed collaboration, where theories and tools from the university courses should be used to solve authentic problems in companies and organisations. The BUFFL model for professional development has been built on the main pillars of technology enhanced learning with online seminars, work-integrated learning with needs-based problems, and active group work with course assignments. Considering that all course participants work full-time, technology enhancement and online activities are crucial. The BUFFL model aims to further facilitate for full-time working learners, by splitting the courses into smaller course modules. Furthermore, the time span for course modules has been stretched out and, as an example, a course module that corresponds to one week of full-time studies is instead given in four weeks.

Firstly, in an initial pre-project phase, cross-disciplinary competence from all the involved partner universities collaborated to identify the actual needs in partner companies and organisations. The three main themes were identified and defined for the course modules were: 1) Change management, 2) Company evaluation, and 3) Customer relationship. These themes were defined in common sessions for all the involved project partners. With the earlier described WIL idea of combining academic theoretic knowledge and the identified organisational challenges, a definition was carried out for course themes, subthemes and learning objectives. This inception phase also comprised activities where subject matter experts in the fields of pedagogy and TEL created course templates, and teaching and learning activities adapted for the virtual learning environment Moodle (Jaldemark & Öhman, 2020).

Secondly, in the implementation phase, the preliminary course modules were built and tested with teachers, facilitators and subject matter experts from the partner universities as the course participants. This phase also involved workshops where teachers and course developers were given support in a combination of face-to-face activities and online sessions. In a quite heterogeneous group, some teachers had a rich earlier experience of TEL, but with a need for reskilling to handle the chosen online platform, and the chosen online conference tools. At the same time, other teachers had to be classified as pure beginners, with a greater need for more fundamental hands-on activities. A good practice that emerged during the process, was when the more TEL experienced teachers created semi-detailed course templates that the less experienced could use as a starting structure in their course modules. As earlier recommended by some TEL researchers, a common structure for course modules belonging to a common thematic block, later showed to facilitate for learners new to online learning. Finally, what turned out to be time-consuming was the support for creating online assessment, and how to record and deploy streaming lectures and tutorials. This is a challenge that was identified many years ago in TEL research (Arabasz et al., 2003), and with a rediscovery during the pandemic for teachers new to TEL (An et al., 2021)

The course design in the BUFFL project has been inspired by the set of principles that were recommended by Cremers et al. (2016). Nine design principles that were defined to support the idea of a multi-directed interface between universities and workplaces: 1) Fostering authenticity, 2) Creating a learning community, 3) Increasing ownership, 4) Utilising diversity. 5) Inter-linking of working and learning, 6) Facilitating reflection, 7) Enhancing individual talents, 8) Assessing for learning, and the overarching principle of 9) Enabling organisation. For the principles of creating learning communities and to stimulate reflection some members in the BUFFL project have taken inspiration from the concept of Communities of Practice (COP), first presented by Lave and Wenger (1991) and later extended in several directions. A CoP should by definition consist of an interest group where the group members share the responsibility for managing useful knowledge and skills in a certain domain. Some important main activities for a CoP are: 1) Brainstorming and problem solving, 2) Knowledge seeking and knowledge sharing, 3) Sharing experiences, 4) Reuse and sharing of resources, 5) Discussions on further development, 6) Project documentation, 7) Identification of knowledge gaps, 8) Study visits and 9) Coordination for synergy effects (Wenger, 2011). These activities have originally been outlined for traditional learning communities, and have find their new adapted forms for TEL in virtual learning environments (Al Hashlamoun & Daouk, 2020).

5. Results

The presentation of the results starts with a general presentation of the translated free-text answers followed by mean and median values for the Likert-scale questions. In the next section free-text answers and Likert-scale questions are compared and grouped thematically.

5.1 Free-text questions

Despite the encouragement to motivate, the majority of the free-text answers are relatively short, but with many interesting comments that complement the Likert-scale answers.

1. Are you satisfied with the learning opportunity in the course module?
The vast majority of the answers starts with 'Yes', and some examples of frequent themes are "Yes, interesting to get facts about things that I've earlier have had a feeling for", "Yes, I got several theoretical views with different measurement methods", and "Yes I'm satisfied, both regarding the course content and the course design. The course theme has been interesting and giving me knowledge that I also can apply in my daily work". There are also some very brief 'Nos' and more elaborate 'Maybes' such as "Yes and No, some of the articles were interesting and gave me thoughts and insight about business models and digitalisation, while other articles were not grounded in reality and didn't give me so much". To summarise, the answers are surprisingly positive in general, with the exception of some relatively short negative answers.
2. Are you satisfied with your own performance in the course module?
The answers to the second question also have a majority of affirmative answers, such as "Yes, I got approved for the course module, learnt several theoretical things, which also were applied practically". However, there are more negative answers as well, often with a positive attitude towards the course design, combined with comments on lack of time to complete all activities. One participant described this as "No, we had a lot of client meetings in parallel which I had to put the main focus on, which entailed that I didn't have energy to read and write essays in the course assignments. However, I got a grip of the subject and It doesn't feel like a waste of time even if I wasn't approved (I didn't write the final report)". There are also answers where the satisfaction has been reduced by conditions such as "Hard to study alone, and lack of time due to circumstances in my workplace", and "I'm not fond of academic writing, and neither interested in learning it, but I liked the other parts of the course".
3. What was especially good when taking the course module?
Many components were appreciated, and with a frequent praise of engaged teachers, reading assignments, and the online seminars: "The seminars, and the discussions around what we had read gave a lot, teachers were flexible, competent and good at facilitating the discussions". Other appreciated aspects were the combination of theory and practice, and the recorded lectures and tutorials. The only negative remarks here were on problems with reading articles in English.
4. What was less good when taking the course module?
One complaint here as well on "Heavy, and specialised literature in English", but the most common themes are "Lack of course structure and instructions" and problems with login and technology in the initial course module phase. Some companies have security restrictions that do not allow employees to use the Zoom video conferencing system. There are also comments on time-trouble and clashes between academia and industry "It's problematic with a setup that is adapted to the university world, my calendar is booked for months ahead. I think that the university could win a lot by better pre-planning, since it's crucial for us to complete a course".

5.2 Likert-scale questions

Table 1. Mean and median values for the Likert-scale questions

	Question	Mean	Median
Q1	How do you estimate your experience of reading course literature in English? (1 = very poor -- 5 = very good)	3.52	4
Q2	How do you estimate your earlier experience of reading research articles? (1 = very poor - 5 = very good)	3.46	4
Q3	How to you perceive the support from your employer for taking this course? (1 = very poor -- 5 = very good)	3.77	4
Q4	How did you perceive the opportunity of bringing your organisation's own data? (1 = very poor -- 5 = very good)	3.57	4

	Question	Mean	Median
Q5	How did you perceive the course instructions regarding technology? (1 = very poor -- 5 = very good)	3.25	3
Q6	How did you perceive the usability of the virtual learning platform Moodle? (1 = very poor -- 5 = very good)	3.97	4
Q7	How did you perceive the technology regarding Moodle and video conferences in Zoom? (1 = very poor -- 5 = very good)	3.72	4
Q8	How did you perceive the pace of study (25%) in the course module? (1 = very compressed -- 5 = very protracted)	2.56	3
Q9	How did you perceive that the pace of study was adapted to your full-time work? (1 = very poor -- 5 = very good)	3.31	4
Q10	How did you perceive the course assessment adaptation to the organisation's own data? (1 = very poor -- 5 = very good)	3.82	4

6. Analysis and discussion

The results of the qualitative analysis have been compared with the quantitative analysis and are presented and discussed below in the categories of 'Technology enhanced learning', 'Work-integrated learning', and 'Bringing your own data'.

6.1 Technology enhanced learning

As pointed out in earlier studies the involved technology is a crucial factor in online environments, and technology by itself does not support professional development (Vrasidas & Zembylas, 2004; Berger & Paul, 2021). There is also the digital aspect of technology enhanced learning. When technology works it is appreciated, but when technology fails it is a constant disturbance. For the BUFL project, it is in the start of the course modules that technology has been disturbing, and that both teachers and participants have struggled with minor technical issues. The introduction to the actual technology, and the instructions for the involved tools and systems could definitely be carried out better. The mean value for Q5 (3.25) is the second lowest and should be interpreted as a signal for updating and improvement. Part of the explanation for the complaints on the technology could be that some of the tools that are frequently used in academia are blocked by some companies' security regulations. On the other hand, both the learning platform Moodle, and the video conference system Zoom get some of the highest mean values and a median of 4 in the answers to Q6 and Q7. However, as brought up in some of the free-text answers, instructions could be written more clearly and sent out longer before the start of a course module. Findings in this category emphasis the need for a further development of the current support model (Mozelius et al., 2020b).

6.2 Work-integrated learning

The WIL idea of applying theories from academia in the solving of real-world problems from the workplaces have worked well. There has also been good support from the companies and organisations with some positive free-text answers, and a mean value of 3.77 for Q3. However, there are also the free-text answers that bring up the challenges with "Hard to study alone, and lack of time due to circumstances in my workplace", and "I'm not fond of academic writing, and neither interested in learning it, but I liked the other parts of the course". To study completely alone is against the rules for the BUFL course modules (Jaldemark & Öhman, 2020), but there seems to have been a few exceptions for really small companies. The respondents that bring up their reluctance to take part in academic writing are few and in a clear minority. It could be wise to take a look at the assignments for the course modules where the negative remarks originate from, and check if there is any relation to the question about earlier experiences of reading research articles (Q2). The same check for the complaints on reading articles in English, where the mean and median values for Q1 are as high as (3.52, 4). What appears to be the most serious challenge is the high pace of study and the lack of adaption to full-time work. There are free-text comments such as "The study guide and the course setup are for students, not for full-time working", and the Likert-scale question on the pace of study gets the lowest mean and median value of all with (2.56, 3). This study plan needs rethinking and redesign, to address an issue that also has been identified as critical in other recent studies on professional development (Roche et al., 2021).

6.3 Bringing your own data

What must be seen as the most positive surprise was that the new and most untested concept BYOD got the least complaints and positive feedback. Q10 on how participant perceived the course assessment adaptation to the organisation's own data got the highest mean value (3.82). The alignment of assessment in courses to the

organisations data is an interesting key factor in the BUFFL project. How data was brought from companies and organisations and used in course modules is the most interesting contribution from the BUFFL project. The BYOD concept supports the aim of a multi-directed meeting between academia and industry with an organisational development for both sides. There is also positive feedback in the free-text answers such as "The connection to reality was very good", and an answer to the question on what had been especially good in the course was: "To take my own company as the starting point". The Likert-scale question on how respondents perceived the opportunity of bringing their organisation's own data (Q4) was also relatively high (3.57, 4). Especially if related to the earlier absence of experience of the BYOD concept, both for teachers and participants in the BUFFL project.

7. Concluding discussion

The research question has been answered, and the BUFFL project in several aspects has achieved its objective. Regarding the TEL aspect, the virtual learning environment and the used tools have supported learning, but the introduction to the actual technology, and the provided instructions for how to use tools must be revised and improved. The WIL aspect has also been successful, but with the remaining challenge of a better adaptation to real-world conditions for full-time working participants. Finally, the BYOD aspect and how brought data have been involved in activities and assignments could be seen as a novelty and the main contribution from the project.

All of the three involved universities have their different lessons learnt from the project. For the oldest and more traditional part the technology enhancement with synchronous online activities is a new and valuable approach that should be developed further. For the two younger universities, where blended synchronous learning has been used for decades, the work-integration and the BYOD concept are the novelties that will be developed further. The plan for the future is that the best practices from the three involved universities, together should lead to a more general and nation-wide model for work-integrated learning. Project experiences of each of the six different companies should be evaluated separately, but the first impression is that the size of the company matters more than the the type of company.

Looking at professional development and knowledge management, the BUFFL model has more to offer for small and medium size companies in rural areas than for large companies in urban areas. Bank and insurance companies in bigger cities often have their own units for professional development to which the suggested BUFFL model does not add that much of value. Compared to the small company affiliations in the sparsely populated northern part of Sweden, where the idea of online collaboration across geographical boundaries can add more to the personal and organisational development and reinforce knowledge management. Moreover, the BUFFL research team has also found new ways for knowledge management and research collaboration, in a project that was pushed further to online collaboration by the Corona pandemic.

To conclude, the positive outcome resulted in a prolongation of the BUFFL project with a repetition and a further development of several course modules. The conclusion is that resources were well spent, and that the outcomes contribute to the development of a more generic and nation-wide model for continuous professional development. It could be argued that the BUFFL project has added value not only for academia and industry, but also for the surrounding society. An interesting idea for a further development is to offer the project model for municipality-led professional development in the future, and this idea has been presented to some interested municipalities. Finally, the results indicate that the model needs to be updated and improved. The two most obvious challenges that need to be addressed are the instructions for how to use technology in the inception phase, and the adaptation to the real-world conditions that full-time working participants have to struggle with.

8. Future work

This study has been conducted by one member of the BUFFL evaluation team. An important next step would be to discuss the findings in the research group, with the idea of an investigator triangulation. There will also be more answers to the course evaluation questionnaire available later when more course modules are completed. A study like this needs to be repeated in terms of different people answering the questions and providing different perspectives on the benefits and challenges. Finally, regarding the free-text comment starting with "Hard to study alone ...", some researchers in the evaluation team are working with a study on how the support

model might be extended to involve practitioner groups that should be multi-directed with connections between different workplaces, and between different universities.

References

- Adekola, J., Dale, V. H., and Gardiner, K. 2017. Development of an institutional framework to guide transitions into enhanced blended learning in higher education. *Research in Learning Technology*, 25.
- Afreen, R. 2014. Bring your own device (BYOD) in higher education: opportunities and challenges. *International Journal of Emerging Trends & Technology in Computer Science*, 3(1), 233-236.
- Al Hashlamoun, N. and Daouk, L., 2020. Information technology teachers' perceptions of the benefits and efficacy of using online communities of practice when teaching computer skills classes. *Education and Information Technologies*, 25(6), pp.5753-5770.
- An, H., Adanu, S., Tutela, J., Berg, C. and Bartle, G., 2021. Supporting University Faculty With Online Assessments During the COVID-19 Pandemic: Challenges and Opportunities. *Intersection: A Journal at the Intersection of Assessment and Learning*, 2(4), p.28155.
- Arabasz, P., Pirani, J.A. and Fawcett, D., 2003. Supporting e-learning in higher education. *EDUCAUSE Center for Applied Research*.
- Baporikar, N. 2016. Lifelong learning in knowledge society. In *Impact of Economic Crisis on Education and the Next-Generation Workforce* (pp. 263-284). IGI Global.
- Berger, R. and Paul, M.S., 2021. Pedagogy vs. Technology: Challenges in Developing Online Courses in Social Work Education. *Journal of Teaching in Social Work*, 41(3), pp.275-289.
- Blaschke, L.M., 2021. The dynamic mix of heutagogy and technology: Preparing learners for lifelong learning. *British Journal of Educational Technology*, 52(4), pp.1629-1645.
- Bohn, N., Bowen, T., Brink, R., Campbell, M., Drysdale, M. T., Gannaway, D., ... and McBeath, M. L. 2017. Work-Integrated Learning in the 21st Century. In *International Perspectives on Education and Society*, Vol. 32, Emerald Publishing Limited
- Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), pp.77-101.
- Bridgstock, R. 2017. The university and the knowledge network: A new educational model for twenty-first century learning and employability. In *Graduate employability in context* (pp. 339-358). Palgrave Macmillan, London.
- Carta, C., Roos, M., Jacobsen, A., Kaliyaperumal, R., Thompson, M., Wilkinson, M.D., Cornet, R., Waagmeester, A., Van Enkevort, D., Jansen, M. and Licata, L., 2017. The FAIRification of data and the potentialities of FAIR resources showed, in practice, at the Rome Bring Your Own Data workshop.
- Černochová, M., Voňková, H., Štípek, J., and Černá, P. 2020. How do learners perceive and evaluate their digital skills?. In *Learning and Performance Assessment: Concepts, Methodologies, Tools, and Applications* (pp. 1453-1464). IGI Global.
- Daniela, L., Visvizi, A., Gutiérrez-Braojos, C., and Lytras, M. D. 2018. Sustainable higher education and technology-enhanced learning (TEL). *Sustainability*, 10(11), 3883.
- Davtyan, R., 2014. Contextual learning. In *Asee 2014 Zone I Conference* (pp. 3-5). USA: niversity of Bridgeport.
- Dhingra, M., 2016. Legal issues in secure implementation of bring your own device (BYOD). *Procedia Computer Science*, 78, pp.179-184.
- Etzkowitz, H., Webster, A., Gebhardt, C. and Terra, B.R.C., 2000. The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research policy*, 29(2), pp.313-330.
- Ferns, S., Campbell, M., and Zegwaard, K. E. 2014. Work integrated learning.
- Gordon, N. 2014. Flexible pedagogies: Technology-enhanced learning. *The Higher Education Academy*, 1-24.
- Habib, L., and Johannesen, M. 2020. The role of academic management in implementing technology-enhanced learning in higher education. *Technology, Pedagogy and Education*, 29(2), 129-146.
- Jackson, D. (2015). Employability skill development in work-integrated learning: Barriers and best practice. *Studies in Higher Education*, 40(2), 350-367.
- Jaldemark, J., and Öhman, P. 2020. Developing a hybrid and networked educational approach to lifelong learning for organisations and employees. In *the 12th International Conference on Networked Learning* (Vol. 12, pp. 1-4).
- Järvinen, A. and Poikela, E., 2001. Modelling reflective and contextual learning at work. *Journal of workplace learning*.
- Kibar, P.N., Gündüz, A.Y. and Akkoyunlu, B., 2019. Implementing bring your own device (BYOD) model in flipped learning: Advantages and challenges. *Technology, Knowledge and Learning*, pp.1-14.
- Lave, J., and Wenger, E. 1991. *Situated learning: Legitimate peripheral participation*. Cambridge university press.
- Matheos, K., and Cleveland-Innes, M. 2018. *Blended learning: Enabling higher education reform*. *Revista Eletrônica de Educação*, 12(1), 238-244.
- Mozelius, P. and Rydell, C. 2017. Problems affecting successful implementation of blended learning in higher education: The teacher perspective. *International Journal of Information and Communication Technologies in Education*, 6(1), 4-13.
- Mozelius, P. 2020. Post Corona Adapted Blended Learning in Higher Education. In *Responding to Covid-19: The University of the Future*: Dan Remenyi, Ken A Grant and Shawren Singh, Reading, UK: ACIL
- Mozelius, P., Jaldemark, J., Bergström, S.E. and Sundgren, M., 2020a. The Concept of 'Bringing Your Own Device' in Scaffolded and Augmented Education. In *Augmented Reality in Education* (pp. 59-70). Springer, Cham.

- Mozelius, P., Håkansson Lindqvist, M., Jaldemark, J., and Öhman, P. 2020b. Towards a Support Model for Work Integrated Professional Development: a first evaluation of the CHIM steps. In *ICERI 2020* (Vol. 13, pp. 64-69). The International Academy of Technology, Education and Development.
- Olson, J. K., and Clough, M. P. 2001. Technology's tendency to undermine serious study: A cautionary note. *The Clearing House*, 75(1), 8-13.
- Patrick, C. J., Peach, D., Pocknee, C., Webb, F., Fletcher, M., and Pretto, G. 2008. *The WIL (Work Integrated Learning) report: A national scoping study*. Queensland University of Technology.
- Picciano, A. 2009. Blending with purpose: The multimodal model. *Journal of the Research Center for Educational Technology*, 5(1), 4-14.
- Python statistics 2021. Mathematical statistics functions (Accessed 27/07/2021) from: <https://docs.python.org/3/library/statistics.html>
- Roche, A., Skinner, N. and McEntee, A., 2021. The green and the grey: the differing professional development needs of early and mid/late career substance use workers. *Drugs: Education, Prevention and Policy*, pp.1-8.
- Roos, M., Gray, A.J., Waagmeester, A., Thompson, M., Kaliyaperumal, R., Van Der Horst, E., Mons, B. and Wilkinson, M.D., 2014, December. Bring Your Own Data Workshops: A Mechanism to Aid Data Owners to Comply with Linked Data Best Practices. In *SWAT4LS*.
- Shen, C. W., and Ho, J. T. 2020. Technology-enhanced learning in higher education: A bibliometric analysis with latent semantic approach. *Computers in Human Behavior*, 104, 106177.
- Smith, C. 2012. Evaluating the quality of work-integrated learning curricula: A comprehensive framework. *Higher Education Research & Development*, 31(2), 247-262.
- Van Rooijen., D.M., 2011. Transforming 21st century corporate-university engagement: From work-integrated learning (WIL) to learning-integrated work (LIW). www.ceiainc.org/journal, p.4.
- Vrasidas, C. and Zembylas, M., 2004. Online professional development: Lessons from the field. *Education + Training*.
- Wenger, E. 2011. Communities of practice: A brief introduction.