

LAPPEENRANTA-LAHTI UNIVERSITY OF TECHNOLOGY LUT  
School of Engineering Science  
Software Engineering

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**CURRENT TRENDS OF BLENDED AND HYBRID LEARNING**

Case study: FABLE Project

Examiners: Associate Professor, Jussi Kasurinen  
Professor, Kari Smolander

## **ABSTRACT**

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Blended learning combines the advantages of both in-person and online learning. Researchers applied various methodologies before and during the COVID-19 pandemic to better understand its impact on educational achievement and how the environment provides a better experience. The thesis examines recent articles by systematic mapping studies, FABLE project surveys, and interviews' findings from administrators, professors, and students in six European nations to analyze how online learning affects faculty and students.

## **ACKNOWLEDGEMENTS**

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## **LIST OF SYMBOLS AND ABBREVIATIONS**

BL	Blended Learning
DLPCA	Discover, Learn, Practice, Collaborate, and Assess
EBSE	Evidence-Based Software Engineering
FABLE	Faculty on Blended Learning
FBL	Flex Blended Learning
FCBL	Flipped Classroom Blended Learning
FODE	Forced Online Distance Education
IEEE	Institute of Electrical and Electronics Engineers
IRBL	Individual Rotation Blended Learning
ISD	Instructional System Design
LMS	Learning Management System
OLE	Online Learning Environments
PBL	Project-based Blended Learning
PEDATI	Online Learning in Higher Education
SLR	Systematic Literature Reviews
SLRs	Secondary research studies
SRBL	Station Rotation Blended Learning
SRL	Self-Regulated Learning
VCS	Video Conference System

# **1 INTRODUCTION**

## **1.1 Background**

Blended learning is more than just combining face-to-face and online teaching. Finding the proper blend of suitable learning venues and instructional techniques to fulfill the learning goals is the most challenging issue. Many instructors are unfamiliar with the phrase blended learning, which is a twenty-first-century term. Despite its importance, many commercial and public organizations viewed the rise of technological applications with suspicion. (Fiel, 2020.)

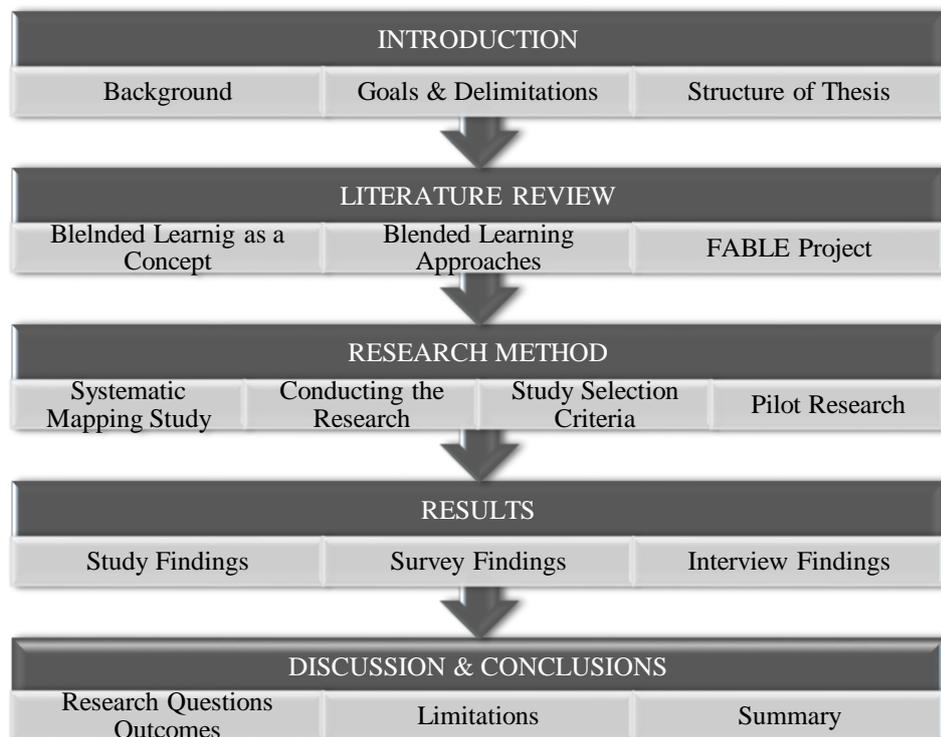
Researchers commonly use the phrase blended learning. However, what precisely do we imply when we state “blended learning”? Truitt and Ku (2018) mention that the term “blended learning” generally refers to using technology to allow students to learn multiple times, places, and speeds. This term includes several approaches that describe how blended learning occurs in the classroom. In today’s schools, there are a variety of blended learning methods. Kumar et al. (2021) described blended learning as an online learning experience that assists students in engaging in meaningful learning through flexible online information and communication technology, less overcrowding in the classroom, and a structured teaching and learning approach.

## **1.2 Goals and delimitations**

This thesis investigates current trends in blended learning and assesses student and faculty satisfaction at selected universities in target countries, including Finland, Germany, France, and Hungary. Spain. The study's secondary goal is to identify students' social and technological challenges regarding the survey and interview results. The author compares the survey results from the partner universities. The survey is a part of the Erasmus + Training Faculty on Blended Learning (FABLE) project funded by the European Commission. Its purpose is to identify the needs, challenges, and expectations of higher education students, lecturers, and administrative staff regarding online and blended learning.

### 1.3 Structure of the thesis

The first chapter contains the introduction and background of the thesis. Moreover, the research questions and research methods are described. The rest of the thesis is organized as follows: Chapter 2 covers the literature review. In chapter 3, the research method is discussed. Next, in chapter 4, the results are explained. Finally, the conclusions are reviewed in chapter 5.



**Figure 1.** The structure of the thesis

## **2 LITERATURE REVIEW**

A literature overview on blended learning is presented in this chapter. The first part discusses the study's context as well as the philosophy of blended learning. The second section describes the blended learning approach. The final portion of this chapter describes the FABLE project.

### **2.1 Blended learning as a concept**

Blended learning is more than just combining face-to-face and online teaching. The most challenging problem is determining the right combination of appropriate learning venues and instructional strategies to meet the learning objectives. Many teachers are unfamiliar with the phrase "blended learning" as a twenty-first-century concept. Despite its importance, many commercial and public organizations viewed the rise of technological applications with suspicion. (Fiel, 2020.)

Researchers commonly use the phrase blended learning. Nevertheless, what precisely do we imply when we say "blended learning"? Truitt and Ku (2018) mention that the word "blended learning" generally refers to using technology to allow students to learn multiple times, places, and speeds. Various models that define how blended learning appears in the classroom are included in this term. In today's schools, there are a variety of blended learning methods.

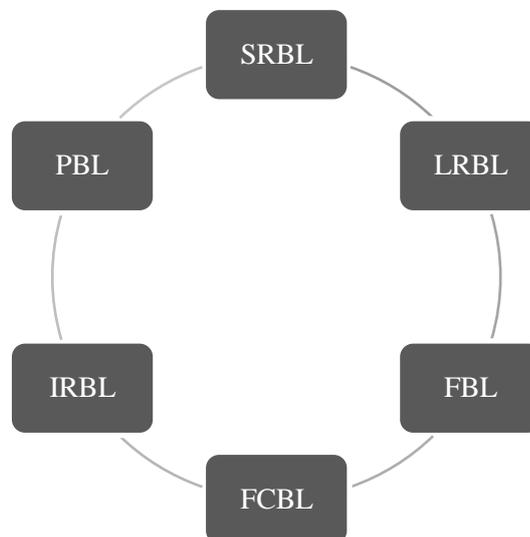
Kumar et al. (2021) described blended learning as an online learning experience that assists students in engaging in meaningful learning through flexible online information and communication technology, less overcrowding in the classroom, and a structured teaching and learning approach. Abusalim et al. (2020) pointed out that blended learning, often known as hybrid or mixed learning, can take various forms depending on the definition used. There is not just one definition of blended learning in the literature.

According to Driscoll (2002) and Harvey (2003), Blended learning can be termed blended learning even if it takes place entirely in the classroom because a component of class work is completed by students utilizing online resources in classrooms. According to Graham

(2006, 2013), Blended learning combines traditional and online learning. Finn (2004) and Boelens et al. (2015) clarify that combining traditional and online learning collects the benefits of each, ignoring the disadvantages of each. According to Boelens et al. (2015), blended learning is reduced face-to-face class time.

## 2.2 Blended learning approaches

According to the existing literature, there are numerous blended learning approaches, including SRBL, LRBL, FBL, FCBL, IRBL, and PBL, as figure 2 depicts. The following sections cover each strategy in detail.



**Figure 2.** Blended learning approaches

### 2.2.1 SRBL

SRBL is the student's rotation between the learning stations. These rotations are either pre-determined on a set timetable or are flexible in the teacher's opinion. If at least one of the learning stations is online, SRBL can be called a blended learning paradigm. SRBL has been discovered to be simple to implement (Saragih et al., 2020). Truitt and Ku (2018) state that the instructor divides the learners in a classroom into three or four groups under the Station Rotation approach. These teams shift through a sequence of stations, one of which must include technology. In this technique, the instructor sets up several stations for students to cycle through within the classroom. The learners move to the next station and begin working

on the assignment assigned to that station at a time set by the teacher. Based on the demands of students and teachers, or the availability of electronic equipment, the classroom can be separated into two, three, or even four separate stations. One option to set up a three-station rotation is to have one station dedicated to instructor teaching, a second station for online education, and the third station for group work with a small group of peers. It is essential to mention that students must use technology to study material for the Station Rotation to be classified as blended learning. It should not just be a chance for students to play online games. (Truitt and Ku, 2018.)

### **2.2.2 LRBL**

LRBL is a rotating model as well. In this approach, a teacher or expert has the freedom to choose a pre-defined rotation model or a dynamic model based on their understanding of the situation and changes in the environment. In this arrangement, one station should be dedicated to online learning, while the other can choose from various learning possibilities. Different experiments to implement this paradigm in real-time settings are mentioned in the literature. (Cari et al., 2017.)

### **2.2.3 FBL**

Online learning is the core of student learning in Flex Blended Learning (FBL). Face-to-face help from teachers is offered through various activities, including small-group project-based interactions, one-on-one tutoring, group discussions, and classroom activities. The teacher is on-site for any help, and the student has a well-planned timetable for their study in this form of learning. (Deshpande et al., 2020.) Truitt and Ku (2018) mention that the Flex model allows students to study in various ways. In this approach, students spend much of their time learning on a school site while using computer-based software. For optimal learning possibilities, students can join a small group and teacher-guided activities as needed. Mujacic et al. (2013) state that FBL is a blended learning paradigm in which students mainly study online using a suitable e-learning system, with material and teaching have given online. The face-to-face part is handled flexibly to meet the requirements of the students. It can take several forms, including small-group tutoring, group projects, laboratory work, and individual tutoring.

#### **2.2.4 FCBL**

Flipped classroom-based learning (FCBL) is an instructional technique for changing group learning from direct instruction to individual learning in a dynamic and interactive setting. In this setting, the teacher helps the students apply what they have learned, resulting in innovation. A flexible environment, learning culture, purposeful content, and experienced instructor are the four components of FLIP learning (Thai et al., 2017). Brame (2017) states that lectures are replaced by the out-of-class distribution of streaming video, reading materials, online discussions, and other resources in flipped classrooms. In-person contact, such as small group problem solving and discussion, is emphasized during face-to-face class time. As a result, outside of class, students do lower-level cognitive activities linked to knowledge and understanding.

The remainder of class time is devoted to higher-level cognitive tasks such as application, analysis, synthesis, and assessment. According to Hall et al. (2016), flipped instruction appears ideal for the discipline when considering the business and professional communication instruction's current theoretical and practical factors. Some lecturers report using the idea for at least parts of their courses for some time. Truitt and Ku (2018) state that the blended learning experience in a flipped classroom is very different. This technique takes classroom education and puts it in the form of a video that students may watch at home. Work that would typically be considered homework is performed in the classroom with the teacher's assistance.

#### **2.2.5 IRBL**

In individual rotation blended learning (IRBL), students rotate stations according to a pre-determined timetable created by an instructor using the software. The majority of these conversations are pretty basic and do not use IRBL in real-world scenarios. However, investigations on IRBL have revealed that this technique uses a pre-programmed collection of playlists. This playlist is pre-programmed, and the learner may switch between stations and learn at their own pace (Kirillova et al., 2019).

Yang and Newman (2019) state that e-learning, discussion groups (seminars), actual laboratory work, and self-motivated assignments are known as “mini-projects” are all part of the individual rotation to blended learning. When considering how higher education is altering its approach to students’ general abilities, it is evident that greater emphasis should be placed on employing multi-modular teaching techniques. These strategies assist students in acquiring essential general skills, including logical, analytical, and creative thinking. During the learning process, rotational blended learning aims to increase student participation and enhance educational results.

### **2.2.6 PBL**

Alamri (2021) mentions that the PBL technique creates the engaging of two or more students at a certain level in the planning, delivery, and collaboration process and primarily evaluating students via reflective discussion and sharing learning knowledge. The PBL technique has been shown to give beginner students a valuable learning experience, a wide variety of information, and support their professional and personal development. Working as part of a group allows individuals to progress from “experts” to “expert learners.” Learners can also participate with professors in the classroom, sharing authority and knowledge on various topics and sharing the research process.

The PBL model is an effective method for improving learning processes and practices in several recent research. In addition, PBL learning methods can catch the students’ attention because the consequences are positive and beneficial to their future profession (Kirillova et al., 2019). The PBL technique has several advantages for students and learners to make it a very wonderful experience. First, students can learn through a new instructional strategy or from a different perspective when working in a group. Second, the PBL approach provides students and learners with professional and emotional support and enhanced learning and professional and personal growth. Finally, the PBL method allows students to evaluate their experiences while teaching by sharing their own critically. Regardless of the inherent disadvantages of this learning paradigm, students who study in groups succeed more than students who work individually. (Alamri, 2021.)

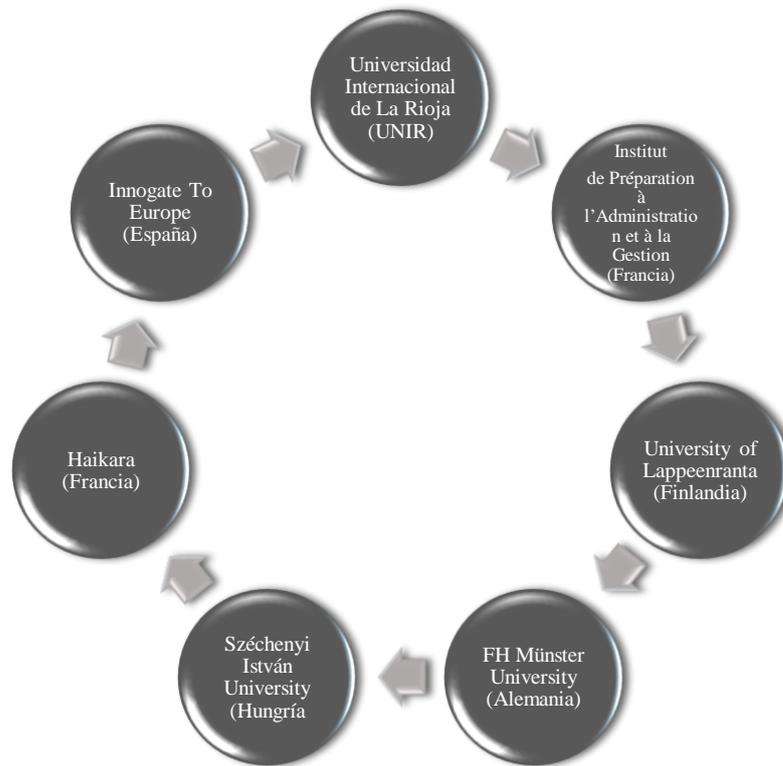
## 2.3 FABLE Project

FABLE is an Erasmus + funded project to identify the needs, challenges, and expectations of higher education students, lecturers, and administrative staff regarding online and blended learning. The Research Institute for Innovation and Technology in Education (UNIR iTED) is a partner in the European Project 'Training Faculty on Blended Learning,' which began on March 1, 2021. The project's budget is around 300,000 euros, and it is funded by the Erasmus+ initiative KA226, Strategic Partnerships for Higher Education - Digital Education Readiness. It is a unique appeal made in response to the Covid-19 epidemic to prepare education and training institutions to meet the problems posed by the recent abrupt change to online and distant learning. The initiative is being directed by the French Business School IPAG and will last two years. In addition, four different European institutions and two firms specializing in entrepreneurship and innovation are participating. (Unir research, 2021).

FABLE's goal is to assist higher education teaching staff in designing and implementing blended learning programs that fully utilize the benefits of this approach. The method combines face-to-face teaching, live videoconferencing courses, online accessible recorded courses, micro-learning, and online self-training. The project will seek and achieve the following objectives to attain this ultimate goal:

- Blended learning and blended learning training include developing a knowledge bank to understand better the requirements and expectations of students and trainees and professors, educators, and trainers.
- Conceive and test a technique for converting in-class courses to blended learning courses that use the advantages of this mode of instruction, including a guide to distance learning technologies.
- Design, build and deploy a tool to teach faculty on blended training to assist them in creating blended learning courses.
- Create a white paper for educational systems to use as a guide for supporting the digital transformation of their teaching with effective performance metrics.

As the online training platform leader and a collaborator on other project responsibilities, UNIR contributes to FABLE with its skills and knowledge in the technology sector. Figure 3 shows the project partners.



**Figure 3.** The FABLE project's partners

The purpose of the literature research was to assist the author in having a general understanding of the subject. It was also valuable to know about what researchers have accomplished in previous studies.

### **3 RESEARCH METHOD**

The thesis' research method chapter is divided into four sections: First, the Systematic Mapping Study is briefly reviewed. Next, the research plan, study selection criteria, and pilot search are discussed.

#### **3.1 Systematic mapping study**

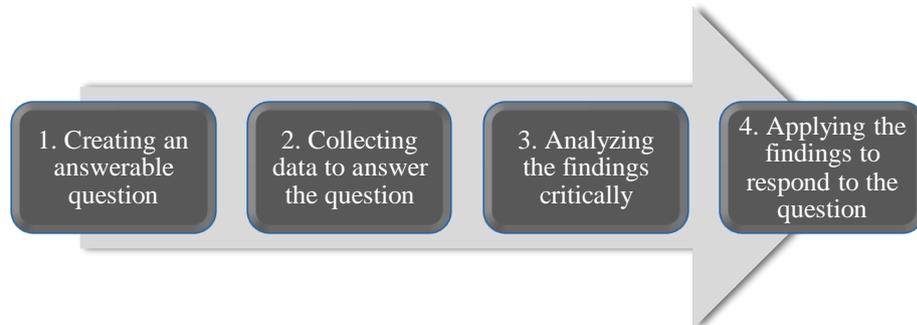
Budgen et al. (2008) state that A systematic mapping study is an objective technique for evaluating the kind and scope of the available research to address a specific research question. These types of studies can assist in determining research gaps and suggesting topics for additional analysis. As a result, they offer a structure and framework for future research efforts to be appropriately designed.

Systematic mapping research is an excellent way to study blended learning trends. A mapping study is a type of literature review that tries to examine a primary issue by identifying, evaluating, and organizing the goals, methods, and contents of prior research that is done. As a result, current research, research gaps, and matured sub-areas may be recognized and explained (Budgen et al., 2008). Petersen et al. (2008) state that a systematic mapping study's primary objective is to offer an overview of a research field and determine the quantity and type of accessible research and findings within it. Plotting the frequency of publication through time is a systematic way to detect patterns. An additional goal may be to discover where research on the topic has been published.

A systematic map for software engineering is a way to create a categorization scheme and structure in a software engineering field of interest. The frequency of publications for categories within the system is the focus of the analysis of the results. The scope of the research field can then be determined. Various parts of the system may be combined to answer more specific research topics. (Petersen et al., 2008).

Kitchenham et al. (2011) proposed that evidence-based software engineering (EBSE) should focus on the gathering of empirical data and that systematic literature reviews (SLRs) should

be used as a technique for undertaking an unbiased collection of experimental findings. They proposed 4 phases for the EBSE, as illustrated in Figure 4.



**Figure 4.** EBSE four phases (Kitchenham et al. 2011)

A systematic method for reviewing research literature known as a systematic literature review (SLR) is one of the primary technologies supporting EBSE. Secondary research studies (SLRs) are used to identify, critically assess, and collect all relevant research publications on a given research issue or topic. The technique is designed to make the literature review accurate, comprehensive, and accessible. Kitchenham et al. (2011) claimed that mapping studies follow the same fundamental approach as SLRs. However, instead of answering questions about the benefits and disadvantages of alternative technologies, which traditional SLRs do, they attempt to discover and categorize all relevant research to a general software engineering issue. They are designed to give a broad overview of a subject area and determine whether there are sub-topics with enough research papers to perform traditional SLRs and sub-topics where more relevant studies are required.

### **3.2 Conducting the search**

The below top scientific literature digital libraries are selected based on prior positive experiences:

- Google Scholar
- Springer Link
- LUT Primo
- IEEE Xplore

The number of hybrid / blended learning subjects published has continuously increased. According to Google Scholar, only 1450 scholarly publications were published in 2020 and 2021. The focus of these articles remains on software engineering, with subjects such as hybrid learning models, blended learning models, and trends among the covered topics. The expanding range and publications make blended learning research increasingly confusing, requiring systematic analysis and organizing.

### **3.3 Study selection criteria**

A total of 37 primary studies were found from 1450 publications in the blended learning trends. Practitioners can use the 37 software engineering work practices listed, but they should evaluate the research's respective validity and relevance ratings for future research.

Studies that are unrelated to answering the research questions are excluded using selection criteria. Because the research aim was to find out the current trends in blended learning, articles including blended learning, online education, and best practices were recognized as meaningful. The papers were skipped if they were not about blended learning or were about blended learning outside of the software engineering area. The eligibility criteria were used systematically, beginning with the removal of the irrelevant publications based on title and abstract. After that, all articles were reviewed thoroughly to decide whether they should be included or excluded. The requirements to determine which articles should be included or excluded are explained in the following section.

#### **3.3.1 Inclusion criteria**

The papers, including blended learning, online education, and best practices, were identified as meaningful regarding the research questions. The following criteria were used to choose the articles:

- The title or abstract of the article discusses blended learning explicitly.
- The title or abstract of the article mentions hybrid learning explicitly.
- The abstract discusses the blended/hybrid learning topic at the higher education level.

### **3.3.2 Exclusion criteria**

Regarding the research questions, the papers were skipped if they were not about blended learning or were about blended learning outside of the software engineering area. The following were the article's exclusion criteria:

- The paper was about blended learning but not related to software engineering.
- The paper was not accessible as a whole.
- The paper was written in a language other than English.

### **3.4 Pilot search**

The search strings in Systematic Mapping Studies are created based on the research questions. The research aims to find answers to the following research questions:

1. What are the current trends in blended learning based on the papers?
2. Is there any difference in the level of satisfaction of students and faculty?
3. Is there any difference in the level of satisfaction of faculty regarding countries?
4. Are the survey and interviews findings significantly related to students' social and technological challenges in blended/online learning?

The mapping of the study strategy answers the first question—the results of the survey responses to the second and fourth questions. The third question is answered by comparing the findings of the mapping research with the survey. The first pilot search was created with “blended learning and online education and covid-19 and best practices”, “blended learning models and online education and covid-19 and best practices,” and “blended learning and covid-19 and e-learning and online education and distance learning” since 2020, and 2021 can be found in Table 1. The second pilot search was created with “blended learning and online education and best practices,” “blended learning models and online education and best practices,” and “blended learning and e-learning and online education and distance learning” since 2020 and 2021.

**Table 1.** First pilot search results

Source	Search string	Results
<b>Google Scholar</b>	“Blended learning & online education & covid-19 & best practices.”	2020 → 755 papers 2021 → 347 papers
	“Blended learning models & online education & covid-19 & best practices”	2020 → 1310 papers 2021 → 606 papers
	“Blended learning & covid-19 & e-learning & online education & distance learning”	2020 → 1650 papers 2021 → 792 papers

Table 2 shows the results of the second pilot search, which generated a much more appropriate number of search results.

**Table 2.** Second pilot search results

Source	Search string	Results
<b>Google Scholar</b>	“Blended learning & online education & best practices.”	2020 → 1460 papers 2021 → 501 papers
	“Blended learning models & online education & best practices”	2020 → 2620 papers 2021 → 885 papers
	“Blended learning & e-learning & online education & distance learning”	2020 → 2750 papers 2021 → 1110 papers

## 4 RESULTS

Antwi-Boampong and Bokolo (2021) propose that two external factors, such as the institution's desire and intents, affect management's decision to embrace BL. As a result, managers adopting BL must approach the task with sufficient information that addresses the institutions' stated goals and plan to execute BL. When this is done, it should go a long way toward addressing stakeholder concerns and facilitating adoption at both the macro and micro levels of the organization.

Moorhouse and Wong (2021) state that the data were organized according to the blended learning model's three factors: instructional resources, assessment, and communication. They demonstrate how teachers have used synchronous and asynchronous techniques based on each mode's advantages. For example, teachers can use asynchronous instructional tools to manage and produce learning materials for their students. Students can interact with the resources on their own time or with the help of their parents. On the other hand, asynchronous technology may limit the number of times students and professors engage in real-time and communicate regularly. As a result, teachers used Video Conference System (VCS) to arrange synchronous online classes to allow real-time engagement. The professors applied the VCS's several multi-modal capabilities to help their teaching during these live sessions. In addition, teachers used asynchronous and synchronous technology to assist them in assessing students, delivering feedback, and developing real-time and asynchronous communication channels.

Since it focuses on examining social interaction tools and methods that construct the activity systems of people in the BL, activity theory has been in continual flux. Since its inception, its efficiency in comprehending learning processes through information and communication technology has been increasing.

Since it focuses on examining social interaction tools and methods that construct the activity systems of people in the BL, activity theory has been in continual flux. Since its inception, its efficiency in comprehending learning processes through information and communication technology has been increasing. DLPCA includes asynchronous learning using pre-recorded

lectures and synchronous sessions with live interactions. Students learned using the DLCPA strategy during the quarantine as follow:

- (i) Asynchronous learning with video lectures allowed learners to participate at their speed because they could watch the videos again at any time,
- (ii) Checklists like success trackers and weekly guidance enable individuals to plan and manage their tasks, and
- (iii) Asynchronous analyses were successful in identifying the issues.

Gao (2020) states that essential components of teaching and learning stay the same for all despite the significant differences in language, culture, methodology, technology infrastructure, government, and other aspects of international education. Based on the feedback gathered over years of working with various global communities with very diverse teaching conditions in terms of culture and teaching methods, a set of international standards has been developed. These standards can be implemented and modified by any educational institution or organization to help them achieve their goals in student-centered learning in their locally current delivery formats.

Stavtseva and Kolegova (2020) mention that the use of technology in the classroom is increasing, and the opportunities for boosting student learning are endless. Blended learning can increase options for learning by integrating the most acceptable practices of in-class education with the most effective online tools. However, more study is needed to determine the optimal way to create and apply this new learning base.

Lockee (2021) states that the technical and legal procedures for adopting online learning and the infrastructure enabling its access and delivery had to change swiftly due to the Covid-19 epidemic. Considerable resources have been invested, and methods established to link students with course activities and materials, promote communication between instructors and students, and handle online learning administration. At the same time, many people still struggle with access. As a result, greater access and possibilities to online education have now been established, and the next era of online education adopters has a clear path ahead of them.

Vo et al. (2020) state that while courses are structured in the blended learning model, students in soft disciplines do better than classmates in complex fields. Therefore, to develop the most efficient blended learning courses, discipline distinctions should be taken into account. Furthermore, after adjusting for gender and past learning accomplishment, the findings show that clear objectives and expectations, material quality, and interactive learning strongly influence students' performance. These critical aspects represent the effort of teachers' assistance, feedback, and facilitation, despite their statistical non-significance in the study.

Geraldine et al. (2021) offered a broad and complete assessment of instructors' techniques in this aspect, based on a massive data collection done in several areas, at the undergraduate and graduate levels, in four higher education institutions. Students' participation in BL courses was discussed in detail, with asynchronous and synchronous modes used when suitable. They were also connected to student behavioral, emotional, and cognitive involvement when applicable. The outcomes of this study underlined the significance of fully utilizing and combining both modalities in BL to maximize student involvement. To help researchers and practitioners increase student involvement in BL settings, whether asynchronously or synchronously, strategies were divided into three meta-categories and eight categories and concretely shown in various scenarios. Professors suffering from the online form of conventional BL classes and are unsure how to arrange their courses, advise students, and improve the sense of closeness between students and teachers asynchronously online might benefit from the findings.

According to Armellini et al. (2021), a good learning experience is essential but not enough for an excellent overall student experience. The former refers to activities related to learning and teaching, such as attending seminars and other contacts with tutors and peers for the goal of education and evaluation. The entire student experience is the whole university environment that learning occurs. Tutors play a crucial part in both. Students feel the importance of the support of the tutors as vital to boost the student engagement with education and a sense of belonging. While these findings are institution-specific, they imply that practical techniques that include students as collaborators in learning and teaching might

enhance institutions. Students want practical experiences in a variety of learning environments, including the classroom. They will attend sessions that are beneficial to their learning, while many will avoid those not. Consistent synchronous and asynchronous engagement with classmates, instructors, and contents are generally facilitated by continuous educational design and the correct implementation of digital tools, which students highly value. Students want meaningful interactions prior, during, and after sessions, whether held in person or online. Students attribute their satisfaction mainly to the personality and quality of their teachers. They consider assistance to be comprehensive that includes both academic and non-academic components. The differences among various forms of assistance are seen as arbitrary and even harmful. Instructors that provide every type of help those students may seek are valued by them.

Zhao et al. (2021) added to the list of challenges teachers experienced as universities transitioned to online teaching at the start of the UK's COVID-19 national lockdown. The challenges range from technical challenges, privacy issues, and education (facilitating) group activities in synchronous meetings to student interactivity, video duration, and extra time to prepare for teachers in asynchronous sessions. Students found it considerably more challenging to participate in online learning due to a combination of these issues. Another issue was that students were frequently overlooked throughout the shift to an online LMS, causing a further drop in student involvement. The suggestions include offering short instructional or walkthrough videos for students to access the LMS and often unstructured learning resources. Assigning group leaders or using teaching assistants to perform online group activities is also recommended. Also, selecting proper recording software and capturing shorter videos is suggested. They should avoid recording student discussions for privacy issues and student participation instead of providing short informational or walkthrough videos for students to access the LMS and often unstructured teaching materials.

Hamann et al. (2020) state that online courses are popular among students for several reasons, including convenience, learning style, and other factors. At the same time, the results and statistics show that students who take all of their classes online are much less likely to succeed than students who take face-to-face classes in addition to or entirely (re-

enrollment in the next semester or graduation). These outcomes remain genuinely independent of gender, color, ethnicity, or age, often used to identify various student populations. Existing research on student achievement in courses taught in multiple modalities suggests that face-to-face education may have benefits, consistent with the findings. At the same time, the results contrast previous studies that show that the online course load has different effects on student performance as assessed by grades dependent on student demographic groups. In addition, when it comes to retention statistics, students who take all of their classes online are less likely to re-enroll in a subsequent term. These varied results point to the need for more study to understand better the elements that influence student achievement in various contexts and demographic groupings.

According to Kingsbury's (2021) survey data, students' experiences with online learning in Spring 2020 differed significantly depending on whether they were enrolled in face-to-face or virtual schools. That result is not unexpected: virtual schools should outperform their face-to-face rivals, who were pushed to adjust to virtual learning with little notice. However, the scale of the change is unexpected: respondents who said their child "learned a lot" in the Spring were nearly 6.5 times more likely to say they were enrolled in a virtual school. Furthermore, virtual schools' benefit in providing online education is not simply applied to their effectiveness in any aspect of learning. Instead, poll findings show that virtual schools surpass traditional schools in encouraging active learning, effectively communicating, managing a classroom, and offering high-quality education. Minority students, whose parents had far better knowledge about online education in face-to-face schools than white or Asian parents, saw a minor difference. There was also a tiny gap between charter school students and regular public-school students and between private school students and all public-school students.

The outcomes of Zhu et al.'s (2020) study add to the idea that students' SRL competence, online activities, and attitudes have a significant impact on their continued desire to learn online after finishing a blended course. There were found to be mediated connections between these variables. Aside from the participants' views about online learning, their attitudes toward face-to-face learning significantly influenced their desire to attend online courses in the future. It'd be necessary for teachers to consider enhancing social connections

and promoting students' capacity to regulate their learning and employ SRL techniques while designing online courses. Students' online learning experiences may improve as a result of this practice, and their attitudes about online education may enhance, as well as their desire to engage in online learning in the future. More significantly, supporting students in active learning toward a long-term goal will improve students' self-development, whether during their university studies or after graduation.

Dolenc et al. (2021) mentioned that the key findings were that students and educators shared the majority of positive and negative viewpoints; nevertheless, there are certain viewpoints that the two groups do not share. The opposing views outnumber the favorable ones, with instructors being more critical than students. The most positive group is 'Perceived usefulness.' In contrast, the most negative one is 'Technology.' Positive attitudes were related to the quality of one's life rather than one's studies. The work's most significant contribution to the core of knowledge is a comparative examination of students' and educators' unrestricted perspectives of Online Learning Environments (OLE) as the workhorse of Forced Online Distance Education (FODE). They appear to be numerous options for the future. The first is that, sooner or later, the institution will return to its well-pinned "face-to-face" courses in a pre-closure form, which is hopeful and supported by many. The second, more likely option is mixed classes, with online lectures and hands-on exercises. The third scenario is that all schooling would be shifted online, which is certainly impractical. Except for a small number of entirely online education institutions, the second alternative is the most likely future form of OLE.

Ghaeruman et al. (2020) created an ISD model to serve as a guideline for lecturers when developing a course using the blended learning model called PEDATI. PEDATI, as an ISD model, offers interconnected components or processes. The study's findings demonstrated that PEDATI and its aspects were practical and useful. PEDATI and its components were related to learning theories and e-learning ideas, providing an organized, systemic framework, easy to follow, and offers practical guidance for users. The study's findings also revealed that the lecturer's ability to create a course using PEDATI increased. As a result, PEDATI may be a guideline for lecturers to develop high-quality blended learning courses.

This research also offers recommendations for lecturers or instructional designers who want to create a blended learning course.

First and foremost, it is critical to establish precise, practical, and quantifiable learning objectives from the start. Second, it's crucial to break down the material into as many fragmented learning points as feasible. Third, depending on the features of the aims, materials, and state of an existing learning environment, it is essential to identify which learning aspects are appropriate to be provided via synchronous or asynchronous learning activities. Finally, utilizing the LDAE framework to design the learning route, i.e., learning, deepening, applying, and evaluating activities, is critical to make learning more interactive, engaging, and effective.

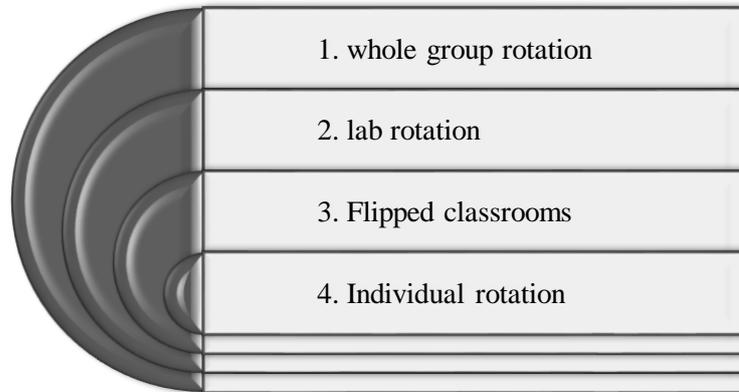
The Şentürk (2021) study's findings revealed that the blended learning model, which was applied for ten weeks in the experimental group, had a more beneficial impact on teachers' academic success and long-term learning than the traditional teaching techniques used in the control group. According to the effect size, the blended learning model significantly impacts students' academic success and long-term learning. Several studies have shown similar outcomes when it comes to the effects of blended learning on academic success. According to studies, students in the experimental group who participated in the blended/online learning process had higher post-test results than those who just went through the face-to-face learning experience. In addition, several studies have found that the blended learning approach increased students' interest and engagement in class and their learning, self-efficacy, self-regulated and self-directed learning abilities, and long-term learning.

In this study, the retention test revealed a substantial difference in favor of the experimental group. Through this finding, lecturers were able to achieve long-term learning by using the blended learning model to develop their self-regulated and self-directed learning skills. They managed through virtual classroom activities outside of school by repeating and reinforcing what they had learned in face-to-face learning.

#### **4.1 Study Findings**

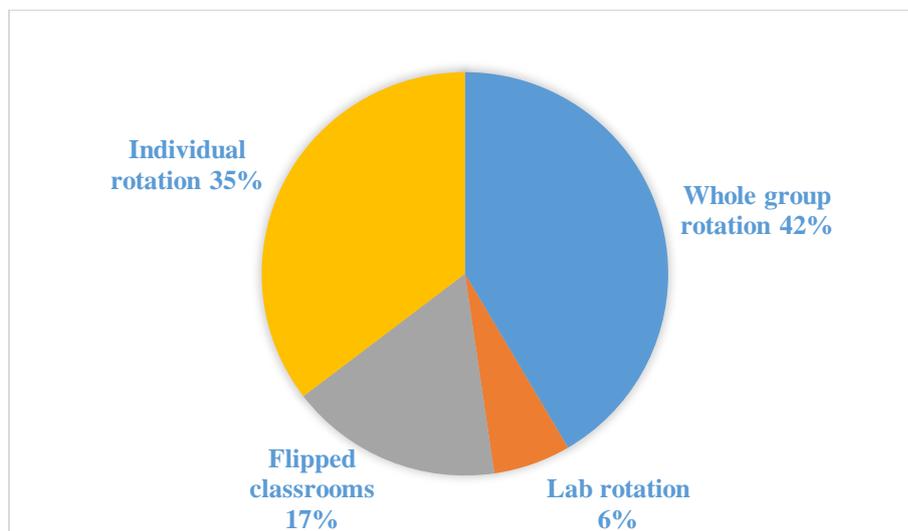
Reading the approved papers and analyzing how they presented issues linked to the study questions helped categorize the articles. The title, publication year, and the most critical topic

of interest were all taken down from each paper. After reading carefully the reports, based on the criteria, the total number of the accepted articles is reduced to 36 unique papers. Figure 5 shows the main categories considered from the studies.



**Figure 5.** The main categories of articles regarding blended learning

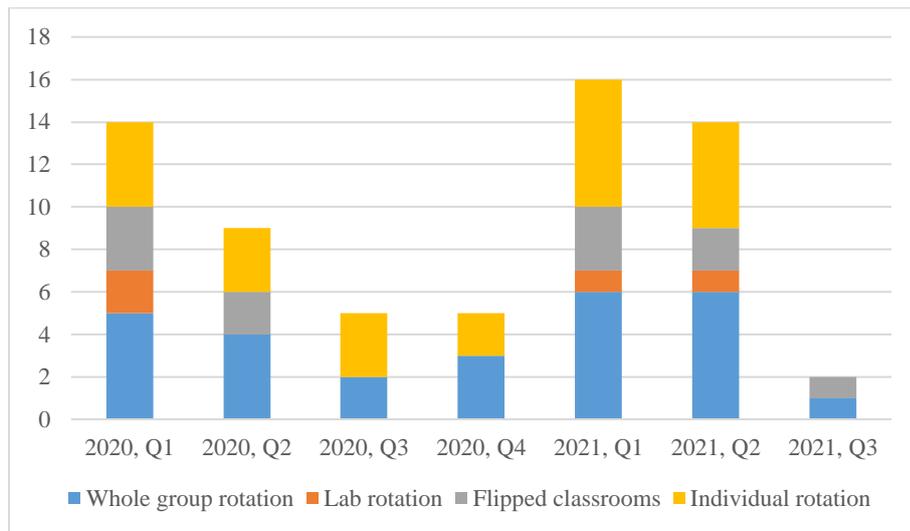
The most popular blended learning method is Whole Group Rotation, with 27 papers. The following popular approach is Individual Rotation, with 23 articles. Next, Flipped Classroom is discussed in 11 reports. The least popular blended learning method is Lab Rotation, with only four articles. Figure 6 demonstrates the distribution of the articles in each category.



**Figure 6.** Number of papers in each category

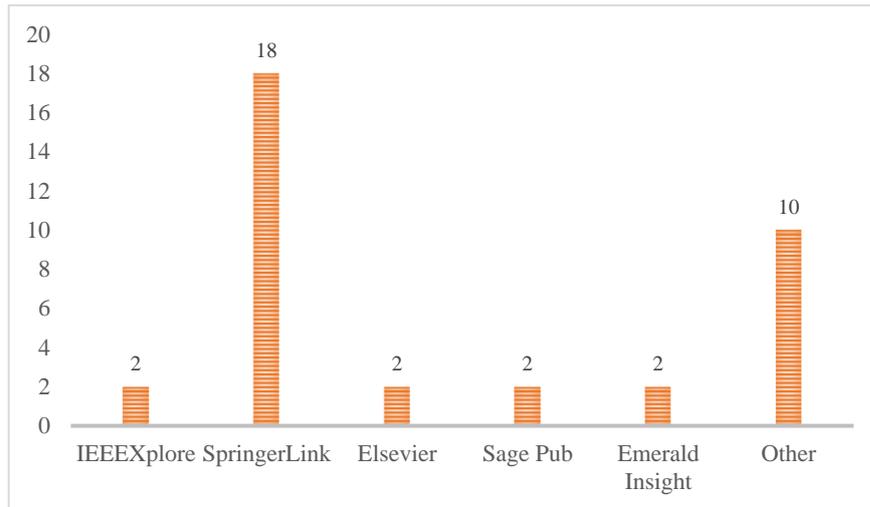
For studying the current trends in blended learning, the papers which are published since 2020 are considered. Due to starting the thesis research in July 2021, most articles are from the beginning of 2020 to the second quarter of 2021, and only two papers are found for the third quarter of 2021.

Figure 7 shows the distribution of articles by publication date in each category.



**Figure 7.** Papers in each category, ordered by date of publication

The papers are mainly found in the five digital databases including IEEE Xplore, Springer Link, Elsevier, Sage Pub, Emerald Insight. The distributions of papers that use the specific digital databases in a total of 36 blended learning trends are shown in Figure 8 With 18 articles, SpringerLink had far more articles.



**Figure 8.** Blended learning trends results by specific digital databases (n=36)

The systematic map of blended learning trends is displayed in Table 3. The table shows the categories and articles for each type. The following section summarizes the key results from the papers.

**Table 3.** The systematic map

Group rotation	Lab rotation	Flipped classrooms	Individual rotation
(Moorhouse & Wong, 2021)	(Campos et al., 2020)	(Moorhouse and Wong, 2021)	(Antwi-Boampong & Bokolo, 2021)
(Astudillo & Martin-Garcia, 2020)	(Bartuseviciene et al., 2021)	(Lapitan et al., 2021)	(Astudillo and Martin-Garcia, 2020)
(Stavtseva & Kolegova, 2020)	(Jackson et al., 2020)	(Zhao et al., 2021)	(Stavtseva and Kolegova, 2020)
(Hien Vo et al., 2020)	(Dong et al., 2021)	(Williams and Corwith, 2021)	(Lockee, 2021)
(Ustun et al., 2021)		(Abusalim et al., 2020)	(Hien Vo et al., 2020)
(Geraldine et al., 2021)		(Richardson et al., 2020)	(Ustun et al., 2021)
(Armellini et al., 2021)		(Alqahtani and Rajkhan, 2020)	(Geraldine et al., 2021)
(Zhao et al., 2021)		(Mavengere et al., 2021)	(Armellini et al., 2021)
(Hamann et al., 2021)		(Dong et al., 2021)	(Zhao et al., 2021)
(Kingsbury, 2021)		(Rosenbusch, 2020)	(Hamann et al., 2021)
(Campos et al., 2020)		(Julia et al. 2020)	(Sistermans, 2020)
(Zhu et al., 2020)			(Martin et al., 2020)
(Sistermans, 2020)			(Dolenc et al., 2021)
(Dolenc et al., 2021)			(Salta et al., 2021)
(Salta et al., 2021)			(Bartuseviciene et al., 2021)
(Bartuseviciene et al., 2021)			(Jackson et al., 2020)
(Williams and Corwith, 2021)			(Chaeruman et al., 2020)
(Jackson et al., 2020)			(Richardson et al., 2020)
(Chaeruman et al., 2020)			(Roslinda Fiel, 2020)
(Abusalim et al., 2020)			(Mavengere et al., 2021)
(Hamdan et al., 2021)			(Dong et al., 2021)
(Richardson et al., 2020)			(Rosenbusch, 2020)
(Roslinda Fiel, 2020)			(Julia et al. 2020)
(Mavengere et al., 2021)			
(Dong et al., 2021)			
(Rosenbusch, 2020)			
(Sunita, 2020)			

## 4.2 Survey

The significant findings of the survey are presented and discussed in this part of the report. The participants' profiles are described first.

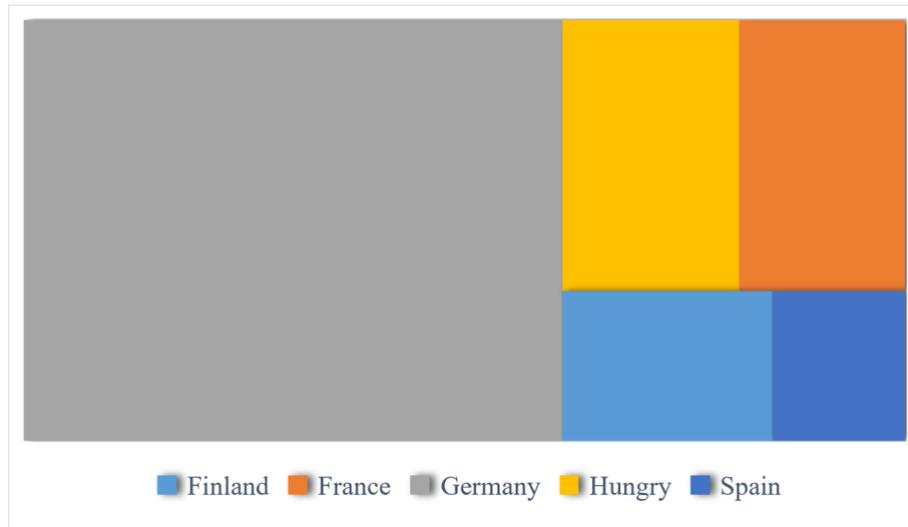
### 4.2.1 Participants

The survey participants are from Finland, France, Germany, Hungary, and Spain, presented in Table 4.

**Table 4.** Survey participants by country

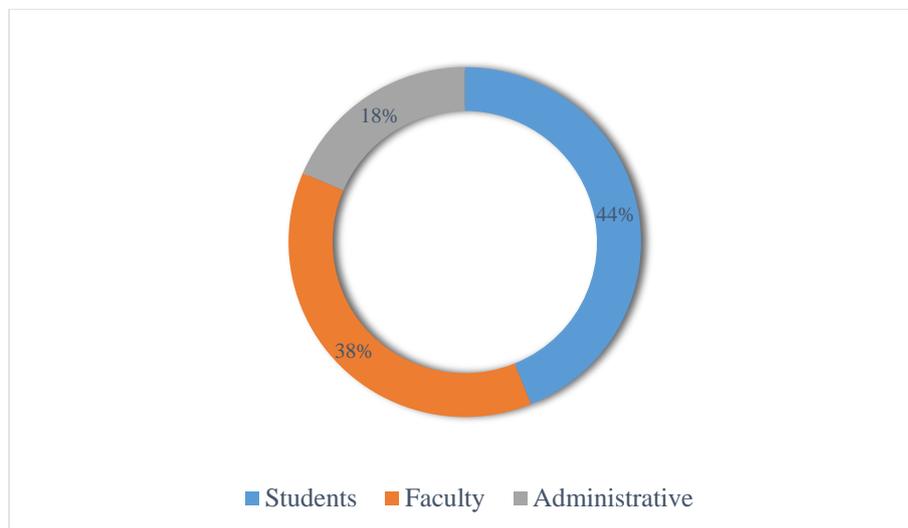
Country	Students	Faculty	Administrative	Total
<b>Finland</b>	5	18	7	30
<b>France</b>	1	13	29	43
<b>Germany</b>	162	49	6	217
<b>Hungary</b>	3	30	13	46
<b>Spain</b>	4	4	11	19
<b>Total</b>	175	114	66	355

As seen in table 4, Germany has the most significant number of survey participants, while Spain has the smallest share. Figure 9 shows how the respondents are classified according to the countries they represent. The majority of the respondents, 61%, were from FH Münster University (Germany), others from Institut de Préparation à l'Administration et à la Gestion (France), University of Lappeenranta (Finland), Széchenyi István University (Hungary), Haikara (France) and Innogate To Europe (Spain).



**Figure 9.** Countries represented by the respondents

Figure 9 reveals that Germany accounts for 61% of all replies. Hungary comes in second place with 13 percent of the participants, followed by France with 12 percent. Only 9% of participants are from Finland. Spain, with 5%, has the lowest percentage of respondents. Figure 10 shows how the respondents are classified according to the department they represent.

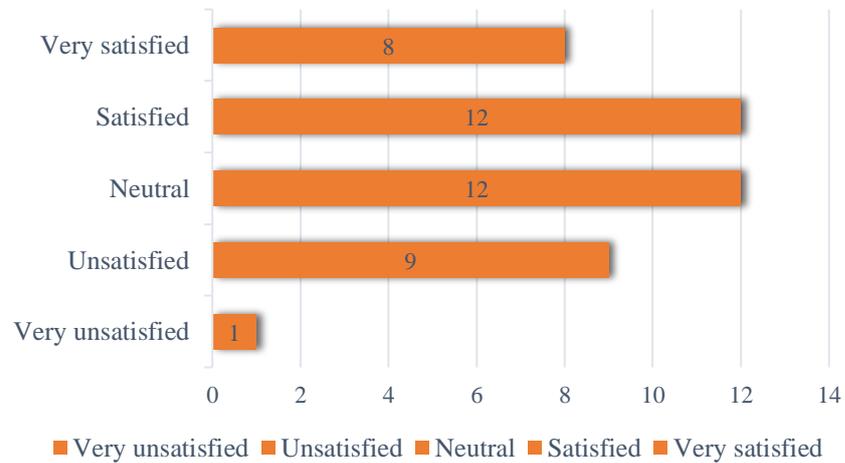


**Figure 10.** Department represented by the respondents

#### 4.2.2 Survey findings

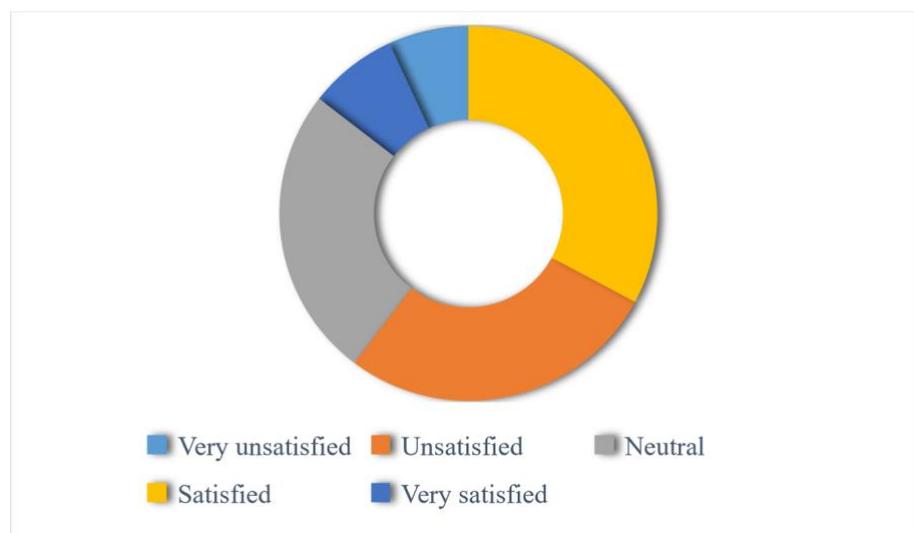
The survey findings are presented in the following parts.

The admins' level of satisfaction with online/blended learning is shown in Figure 11.



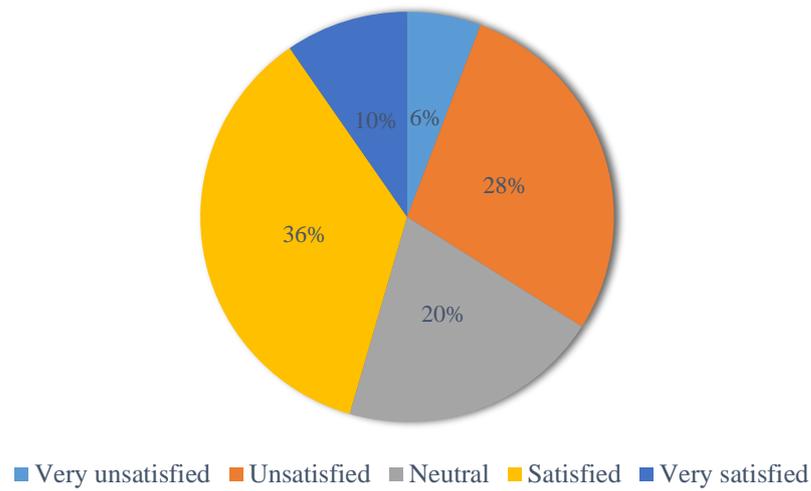
**Figure 11.** Level of satisfaction of admins with online/blended learning

More than a quarter of participants in the admin group are either indifferent or happy with online or blended learning, as seen in Figure 11. However, 21% of individuals are displeased, while 21% are frustrated with online or blended learning. The faculty staffs' level of satisfaction with online/blended learning is displayed in Figure 12.



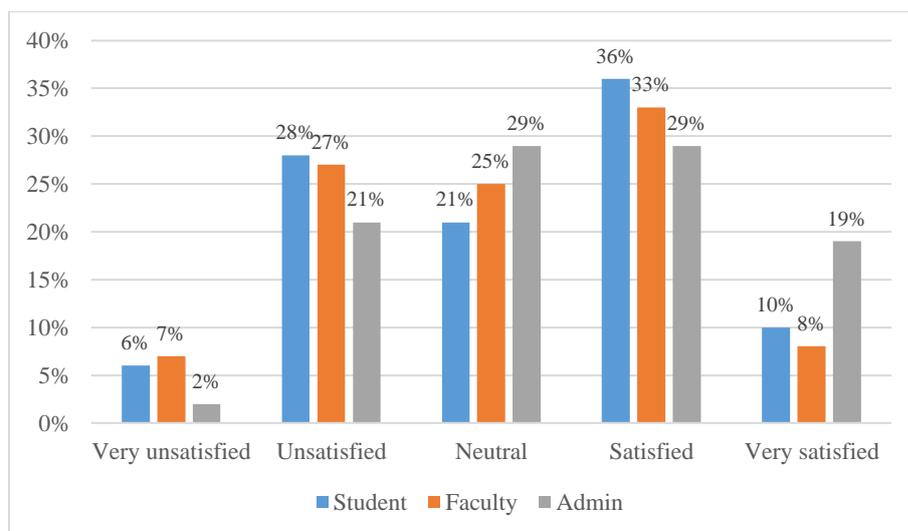
**Figure 12.** Faculty staffs' level of satisfaction with online/blended learning

Considering the Staff group, over 41% of participants are very satisfied or satisfied with online or blended learning. However, 27 percent of staff are unsatisfied, and 8 percent are frustrated with online or blended learning. The students' level of satisfaction with online/blended learning is presented in Figure 13.



**Figure 13.** Students' level of satisfaction with online/blended learning

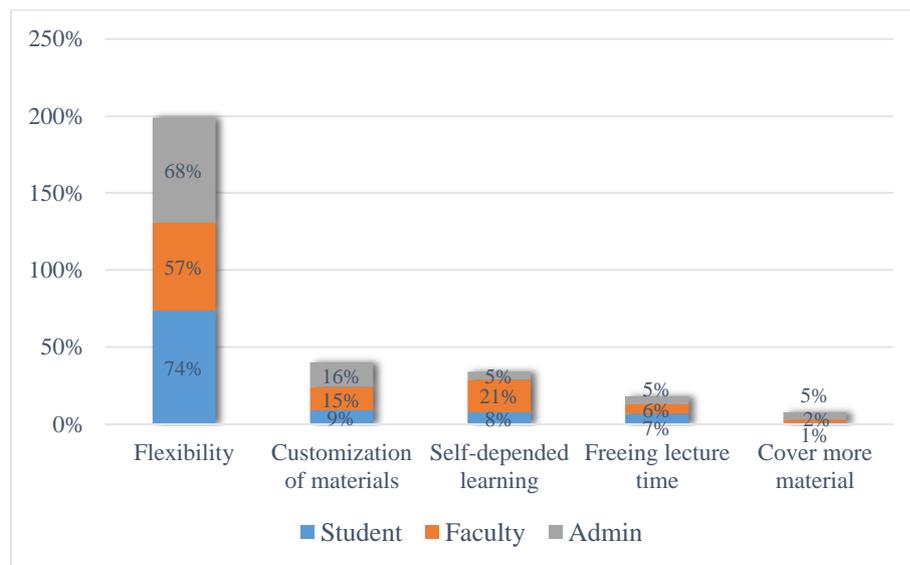
The level of satisfaction with online/blended learning of admins, faculty, and students is compared in Figure 14.



**Figure 14.** Level of satisfaction with online/blended learning of admin, faculty, student

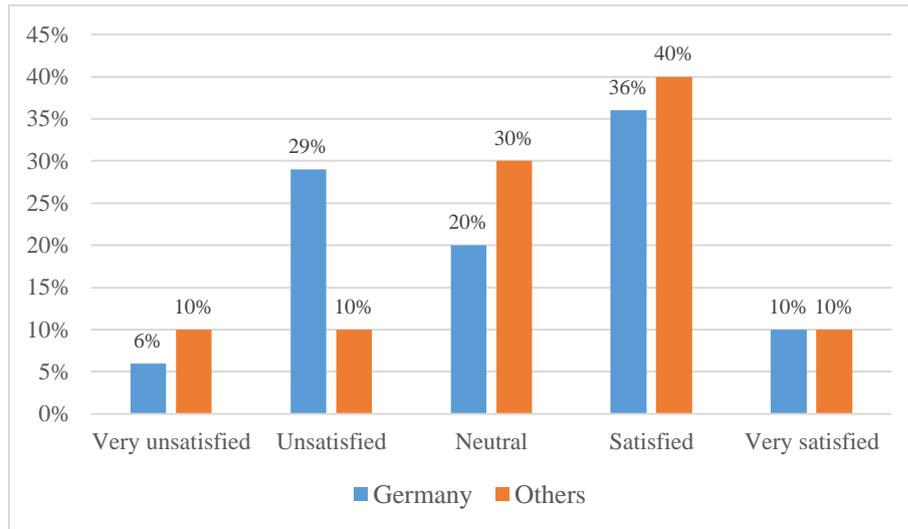
The admins are the most satisfied group (very satisfied and satisfied), 48% followed by students, 46%, and faculty staff, 41%. The admins are the least unsatisfied (Very unsatisfied and unsatisfied), 23%. The students and faculty staffs are more unsatisfied, 34%.

The benefits of online/blended learning regarding students, faculty staff, and admins are presented in Figure 15.



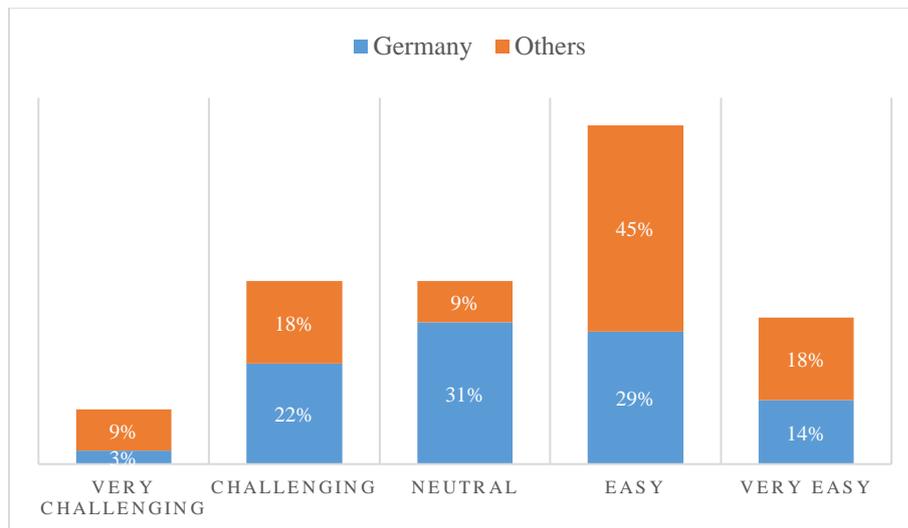
**Figure 15.** Benefits of online/blended learning regarding admin, faculty, student

In the following part, the students’ level of satisfaction with online/blended learning in different countries is compared, as shown in Figure 16. Finland, France, Spain, and Hungary are considered the “others” category in the figure regarding the low number of participants.



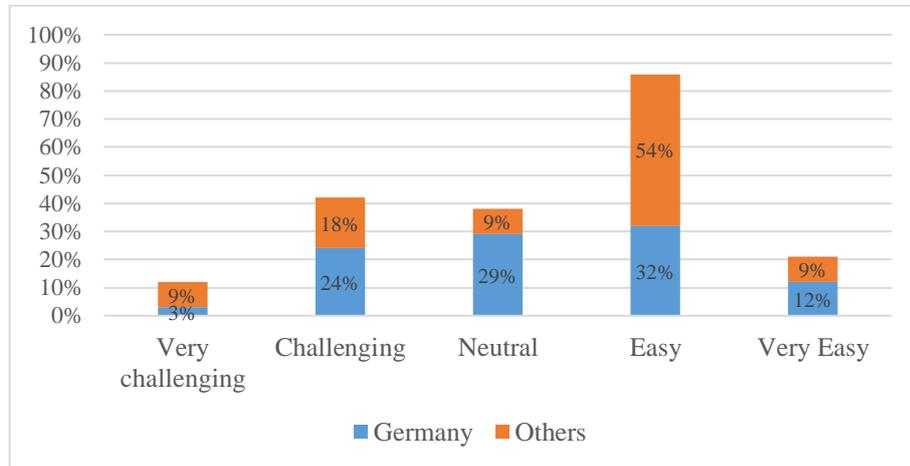
**Figure 16.** Students' level of satisfaction with online/blended learning by country

The students' survey results about using multiple interfaces for online studying by countries are reflected in Figure 17. When it comes to employing different interfaces for online learning, 31% of German respondents are neutral. Only 3% of respondents say these interfaces are complicated. A total of 74% of respondents believe that using different interfaces for online learning is easy.



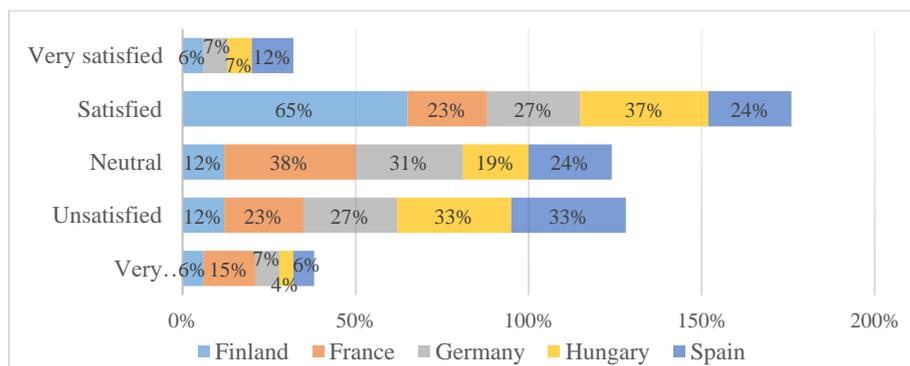
**Figure 17.** Students' survey results about using multiple interfaces for online learning

Figure 18 shows the results of the students' questionnaire concerning organizing various online materials and resources by country. Overall, 86% of students stated that arranging diverse online materials and resources is simple, while 12% believe it is highly challenging.



**Figure 18.** Students' survey results about organizing various online materials

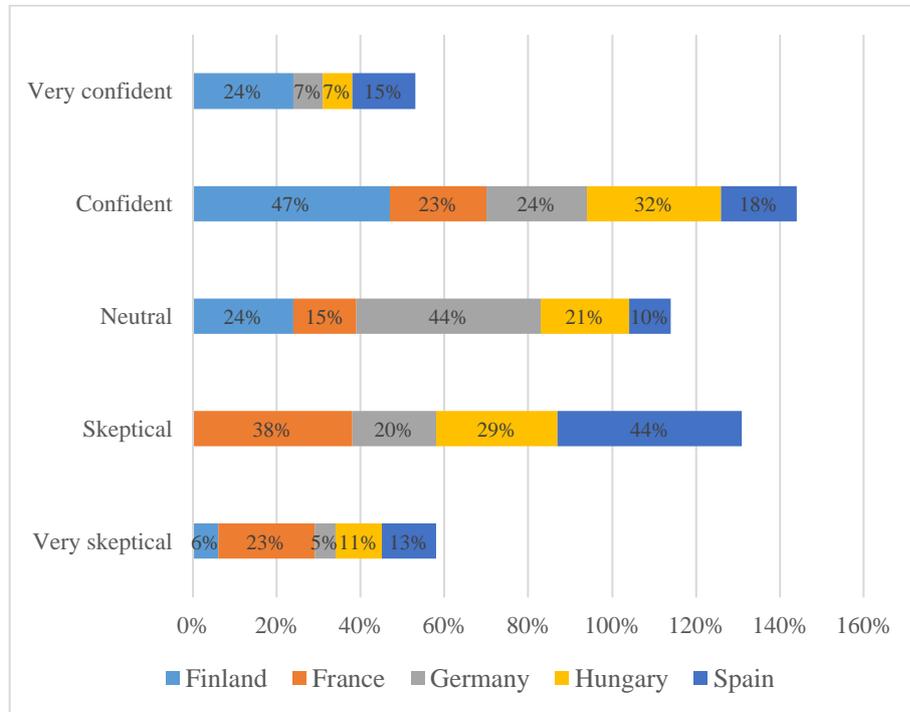
The faculty staffs' level of satisfaction with online/blended learning in different countries is presented in Figure 19. There is 17 faculty staff from Finland, 13 from France, 41 from Germany, 27 from Hungary, and 33 from Spain. The most satisfied group, 71% (satisfied and very satisfied), is from Finland. The least satisfied group, 44% (very unsatisfied and unsatisfied), is from Hungary.



**Figure 19.** Faculty staffs' level of satisfaction with online/blended learning by country

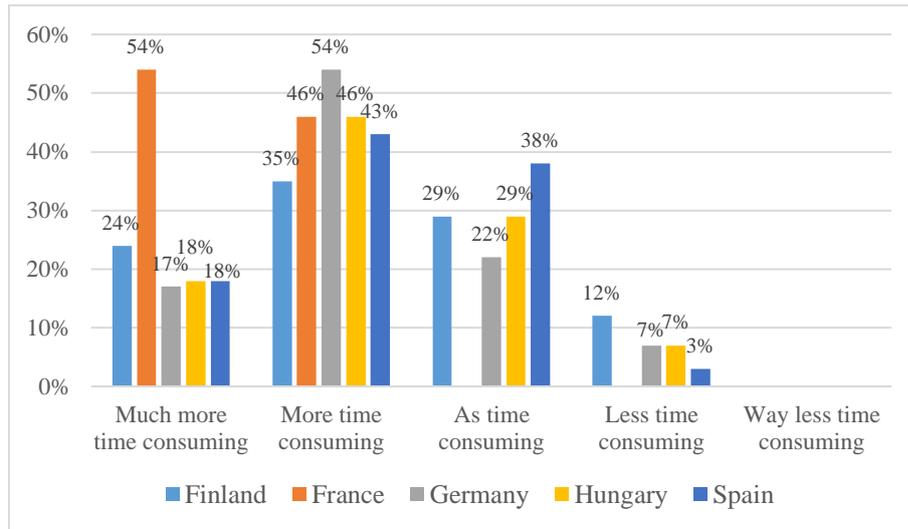
Next, the faculty staff's perspective on the effectiveness of online/blended learning in different countries is presented in Figure 20. There is 17 faculty staff from Finland, 13 from

France, 41 from Germany, 28 from Hungary, and 39 from Spain. The most confident group, 71% (Confident and very confident), is from Finland. The least confident group, 61% (very skeptical and skeptical), is from France.



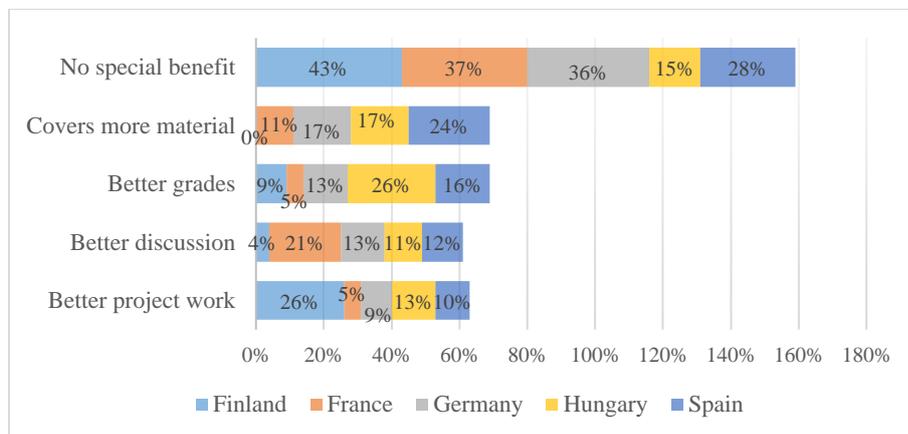
**Figure 20.** Faculty staffs’ perspective about the effectiveness of online/blended learning

Next, the faculty staffs’ perspective about the needed time of online teaching in contrast with traditional instruction in different countries is presented in Figure 21. There is 17 faulty staff from Finland, 13 from France, 41 from Germany, 28 from Hungary, and 40 from Spain. The least time-consuming group, 12% (less time-consuming and way less time-consuming), is from Finland. The most time-consuming group, 100% (Much more time-consuming), is from France. Even, there was not a single reply regarding “Way less time-consuming.”



**Figure 21.** Faculty staffs' perspective about the needed time of online teaching

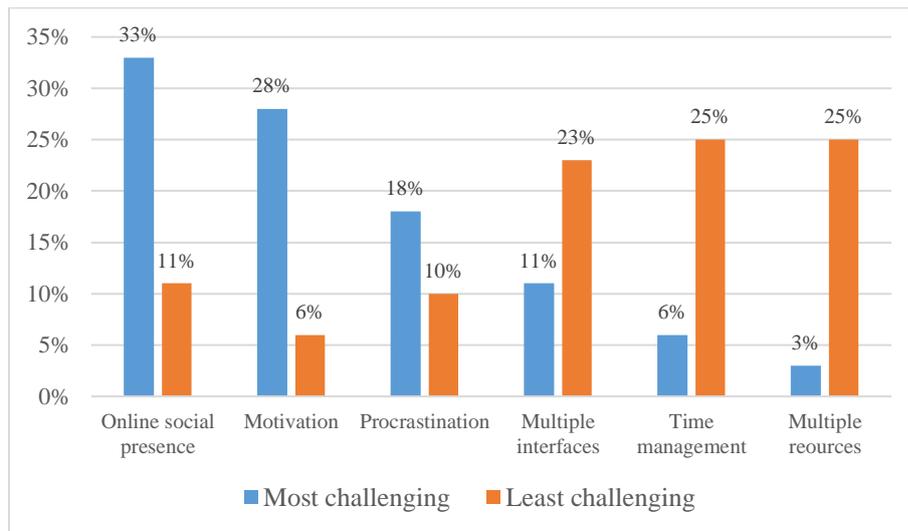
The faculty staffs' perspective about the benefits of your students in online teaching in different countries is presented in Figure 22. There is 23 faulty staff from Finland, 19 from France, 53 from Germany, 46 from Hungary, and 50 from Spain. The 43% survey results from Finland believe there is no particular benefit in online/blended learning compared the traditional teaching.



**Figure 22.** Faculty perspective about benefits of the students in online teaching by country

The difficulties of online/blended learning are then investigated. The problematic issues are divided into two categories: societal problems and technological obstacles. Online social presences, motivation, and procrastination are examples of social problems. Numerous interfaces, time management, and multiple resources are among the technological

hurdles.79% of students mentioned that the social challenges are the most challenging aspects of blended/online learning, comparing 27% of students who believe that the social challenges are the least challenging ones. On the other hand, 73% of students responded that technical challenges are the minor challenges in blended/online learning, comparing 20% believe that technical challenges are the most challenging ones. The results are demonstrated in figure 23.



**Figure 23.** Students' challenges in online/blended learning regarding the survey

### 4.3 Interviews

The significant findings of the interviews are presented and discussed in this part of the report. The participants' profiles are described first.

#### 4.3.1 Participants

I have done four faculty and one administrator interview from LUT University, Finland. The faculty were from the Software Engineering department. Each interview was about 30 minutes. Next, the transcripts were prepared, and personal information was removed from them. They are anonymized to the degree that no person's name is given in the interview transcript. They are also partially AI-generated and manually anonymized.

Appendix 1 contains faculty interview questions, whereas administrator interview questions are available in appendix 2.

### **4.3.2 Interview findings**

The first question in the faculty interview concerned the introduction and experience. Questions 2-4 focused on students, while the remaining questions focused on teachers. The second question concerns students' satisfaction with online learning. The next topic was the difficulties of social presence for learners. The fourth question was about students' lack of motivation and tendency to procrastinate when studying online. Question 5 inquires about instructors' challenges with online/blended learning. The challenge of introducing interactive items was the subject of the following investigations. Question 7 was about the technology use problems. The online/blended learning time-consuming is asked in question 8. Question 9 inquired about the role of blended learning in tackling online learning difficulties. Next, the university's current infrastructure and tools were asked. Question 11 was about the lecturer's most remarkable success story. The last question was about the organization's assistance or pedagogical support.

## **5 DISCUSSION AND CONCLUSIONS**

The research questions are discussed in this chapter. The trends in blended learning are addressed, and a conceptual framework for organizing the study's whole concepts or main results is offered. The review's limitations, relevance to risks, and future research studies are also highlighted and explored.

### **5.1 Research Questions Outcomes**

The research questions are as follows:

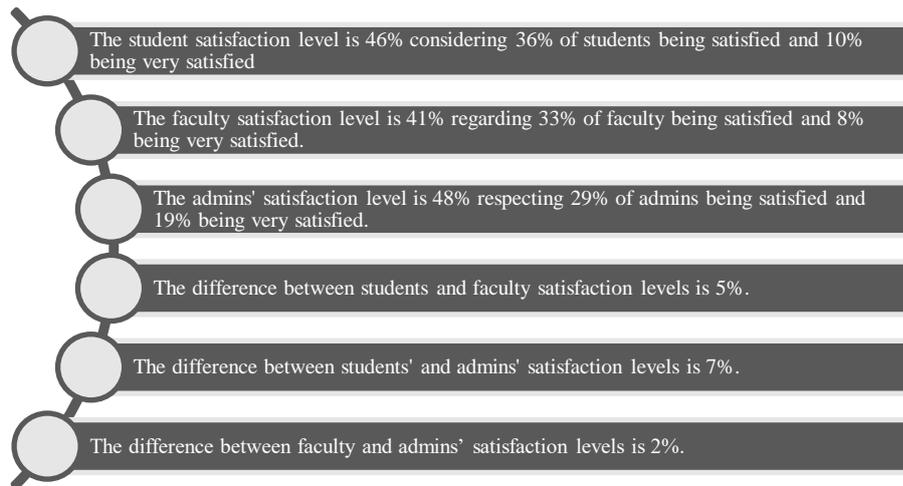
1. What are the current trends in blended learning based on the papers?
2. Is there any difference in the level of satisfaction of students and faculty?
3. Is there any difference in the level of satisfaction of faculty regarding countries?
4. Are the survey and interviews findings significantly related to students' social and technological challenges in blended/online learning?

#### **5.1.1 Current trends in blended learning based on papers**

For identifying the current trends in blended learning, 36 unique articles were studied in this thesis. Next, the articles are categorized into four groups. Whole-group rotation, lab rotation, flipped classrooms, and individual rotation are all possibilities. By far, the most prevalent techniques are whole group rotation and individual rotation. The Whole group rotation was discussed in 27 articles. It was the first widely used blended learning strategy. The next one is Individual rotation which has 23 papers.

#### **5.1.2 Students and faculty satisfaction level**

The satisfied group is defined regarding the satisfaction level. The “satisfied” and “very satisfied” are considered as the happy group. Figure 24 contains the results concerning the students' and faculty satisfaction levels.



**Figure 24.** The satisfaction level of students and faculty

As the results indicate, there is no meaningful difference among satisfaction levels among students, faculty, and admins regarding the differences among these groups' satisfaction levels.

### 5.1.3 Faculty Satisfaction level by countries

The satisfied group is described regarding the satisfaction level. The “satisfied” and “very satisfied” are recognized as the pleased group. Finnish faculty satisfaction level is 71% respecting 65% of faculties in Finland are satisfied, and 6% are delighted. French faculty satisfaction level is 23%, with 23% of faculty in France being satisfied and 0% being very satisfied. German faculty satisfaction level is 34% regarding 27% of faculties in Germany being satisfied and 7% being very satisfied. Hungarian faculty satisfaction level is 44% considering 37% of faculties in Hungary are satisfied, and 7% are very satisfied. Spanish faculty satisfaction level is 36%, respecting 24% of faculties in Spain are satisfied, and 12% are very satisfied. Finnish faculty with a level of satisfaction of 71% is certainly the most satisfied, and French faculty with a satisfaction level of 23% is the least happy.

#### **5.1.4 Students' social and technological challenges in blended/online learning regarding surveys and interviews**

The majority of Finnish faculty in the interview, 3 of 4, highlighted that social challenges such as low motivation, poor socialization, and high procrastination are more significant than technological challenges such as multiple platforms and IT problems. The survey findings explain that for 79% of students, the social challenges are the most challenging aspects of blended/online learning, comparing 27% of students who consider that the social challenges are the least challenging ones.

Conversely, 73% of students responded that technological challenges are the least challenging features in blended/online learning, comparing 20% who believe that technical challenges are the most challenging ones. Both survey and interview findings emphasize that students' social challenges in blended/online learning are more significant than technological challenges.

#### **5.1.5 faculty's opinion about the students' benefits in blended learning**

There are five benefits categories respecting faculty survey findings:

1. Better project work.
2. Better discussion.
3. Better grades.
4. It covers more material.
5. No special benefit.

Figure 25 shows the findings of the faculty's perspective on the benefits of blended learning for students.

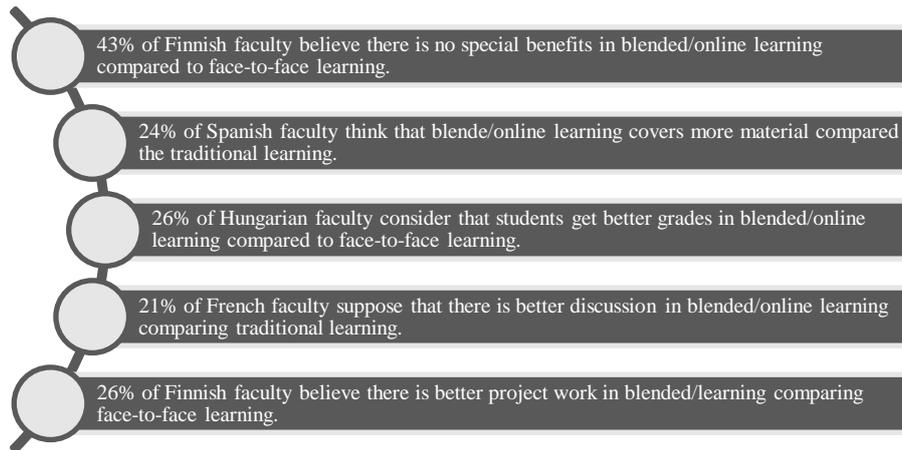


Figure 25. Viewpoints of faculty on the advantages of blended learning for students

## 5.2 Limitations

There are several limitations in the study that should be considered while dealing with the stated findings:

- The study is mainly regarding five digital libraries.
- The systematic mapping study only concentrates on research or scientific articles.
- Books about blended learning were not included in the review.
- The review only considered articles accessible via the LUT account, and the complete texts were available.
- The number of interviews was limited. Four faculty and one administrative were interviewed in Finland.

## 6 SUMMARY

Blended learning combines the advantages of both in-person and online learning. Researchers applied various methodologies before and during the COVID-19 pandemic to better understand its impact on educational achievement and how the environment provides a better experience. The thesis examines recent articles by systematic mapping studies, FABLE project surveys, and interviews' findings from administrators, professors, and students in six European nations to analyze how online learning affects faculty and students. This study indicates four popular approaches in blended learning: Whole group rotation, Lab Rotation, Flipped classrooms, and Individual rotation. The Whole group rotation and Individual rotation are by far the most popular approaches.

There is no significant gap among students and faculty satisfaction levels regarding the students and faculty satisfaction levels.

Respecting faculty satisfaction levels in different countries, the Finnish faculty is undoubtedly the most satisfied, and the French faculty is the least happy.

Considering students' challenges in blended learning, social challenges such as low motivation, poor socialization, and high procrastination are the most challenging aspects.

For future work, it would be essential to include more countries in the research. Several specific questions in the faculty interviews can be added about the applied blended learning approaches and the benefits.

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## **APPENDIX 1. FACULTY QUESTIONNAIRE**

1. Please, quickly introduce yourself and your experience with online or blended learning? Starting with the issues faced by the student.

2. A survey we conducted with students from five EU countries told us that “social” challenges such as low motivation, poor socialization, and high procrastination are more significant than “technological” challenges (e.g., multiple platforms, IT problems) to understand students’ satisfaction with online learning. Do you share this same perception?

3. Building an online social presence appears in the survey as the most crucial challenge for students. How do you see this problem? What lecturers and universities can do to help students develop an online social presence?

4. About students’ lack of motivation and tendency to procrastinate when studying online, what do you think lecturers can do to overcome these issues? And what can the university do?

Now focusing more on the issues faced by the lecturer.

5. The survey mentioned earlier also included faculty members. Similar to students, faculty also stressed social challenges as more relevant than technological ones to their satisfaction with online learning. In particular, faculty complained about low student engagement and the lack of feedback. Do you agree that these are the most challenging aspects of online learning? If yes, what can be done to increase student interaction levels?

6. The survey also showed faculty’s difficulty introducing interactive materials (e.g., quizzes) and having a pedagogical purpose. Do you also think this is a significant challenge? Have you created materials that did not achieve their pedagogical goals?

7. The survey also stressed problems regarding technology use. For example, having to solve technical issues or having to learn new tools and software constantly. What do you think educational institutions can do about that?

8. Another finding of the survey is that online learning is more time-consuming for faculty than traditional lectures. Why is online learning, in general, more time-consuming? What can be done to make online education more time-efficient for faculty?

9. Do you think blended learning (face-to-face sessions between online activities) could contribute to addressing the issues you mentioned? How?

10. Please describe your university's current infrastructure and tools that help teachers develop online courses (e.g., help teachers give lectures/events online). Does it have any shortcomings or things you consider are still needed? What are these things?

11. What do you consider the most remarkable success story you have accomplished or know of regarding online-enabled education in universities? Why do you think it is a "success"?

12. Does your organization provide assistance or pedagogical support for online teaching? If yes, what do you consider the most helpful assistance? Have you taken any of these courses? If not, what type of online course would you consider taking?

## **APPENDIX 2. ADMINISTRATIVE STAFF QUESTIONNAIRE**

1. Please, quickly introduce yourself and your experience with online or blended learning?
2. How do you select the appropriate online learning technology/platform? What are the main challenges associated with this choice (and how were they solved)?
3. Literature shows that lecturer and student training is a critical yet challenging aspect in implementing online learning. How do you see the importance of training, and what challenges have you encountered (and how were they solved)?
4. What is the influence of costs (technology and training) in implementing online learning systems?
5. Literature has identified that some lectures are highly resistant to change when moving to online/blended learning? In your opinion, how can one deal with highly resistant faculty? And what could universities do about it?
6. From your (administrative) perspective, how do you see the whole introduction/transition from traditional to online learning? Is there something you think is particularly important to consider?

### **APPENDIX 3. ADMINISTRATIVE STAFF SURVEY**

Q1 Gender

Male (1)

Female (2)

I identify as (3) \_\_\_\_\_

Q2 What is your age?

<20 (1)

20-30 (2)

31-40 (3)

41-50 (4)

50+ (5)

Q4c What is for you the main role of the lecturer in online/blended learning? (you can choose more than one option)

Technological support (1)

Facilitate discussion (2)

Create, organize and deliver content (3)

Another role (please, write it here) (4) \_\_\_\_\_

Q5c Selecting appropriate online learning technology (e.g., hardware, learning platforms, content providers) is for you:

Very challenging (1)

Challenging (2)

Neutral (3)

Easy (4)

Very easy (5)

I don't know (6)

Q6c Providing adequate online learning training to teachers and students is for you:

- Very challenging (1)
- Challenging (2)
- Neutral (3)
- Easy (4)
- Very easy (5)
- I don't know (6)

Q7c The additional costs associated with implementing blended learning/online learning is an aspect that you find:

- Very significant (1)
- Significant (2)
- Neutral (3)
- Not significant (4)
- Not significant at all (5)
- I don't know (6)

Q8c In contrast with "traditional" teaching, online/blended teaching is:

- Much more cost-effective (1)
- More cost effective (2)
- As cost effective as (3)
- Less cost effective (4)
- Much less cost effective (5)

Q10c Please, rank the following alleged benefits of online/blended learning, from most to less relevant to you. Assign 1 for most relevant and 5 for the least relevant. (Drag and drop)

\_\_\_\_\_ Flexibility; students can study anytime, anywhere and at own pace (1)

\_\_\_\_\_ Level of customization/individualization of the learning materials (video, text, games, collaborative platforms, etc.) (2)

\_\_\_\_\_ Fostering self-depended learning (3)

\_\_\_\_\_ Freeing lecture time for discussion and reflection (4)

\_\_\_\_\_ Ability to cover more material in less time (5)

Q11c About your level of satisfaction with online/blended learning, you are:

Very unsatisfied (1)

Unsatisfied (2)

Neutral (3)

Satisfied (4)

Very satisfied (5)

I don't know (6)

Q12c What are the main technical challenges you encountered when implementing online/blended learning in your organization?

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Q13c What aspects do you consider most critical to the successful implementation of online/blended learning?

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## APPENDIX 4. STUDENTS & FACULTY STAFF SURVEY

Q1 Gender

Male (1)

Female (2)

I identify as (3) \_\_\_\_\_

Q2 What is your age?

<20 (1)

20-30 (2)

31-40 (3)

41-50 (4)

50+ (5)

Q3 You are a

Student (1)

Faculty (2)

Skip To: Q4b If You are a = Faculty

Q4a You are currently attending a:

Bachelor program (1)

Master program (2)

Another program (3)

Q5a What is your primary area of study:

Business and accounting (1)

Engineering (2)

Arts and Humanities (3)

Social sciences (4)

- Natural sciences (5)
- Computer science (6)
- Health sciences (7)
- Others (8)

Q6a Before the COVID-19 pandemic, you attended courses (you can mark more than one answer):

- 100% face to face (1)
- 100% online (2)
- Blend of online and face-to-face. (3)

Q7a During the COVID-19 pandemic, you are attending courses (you can mark more than one answer)

- 100% face to face (1)
- 100% online (2)
- Blend of online and face-to-face. (3)

Q8a What is for you the main role of the lecturer in online/blended learning? (you can choose more than one option)

- Technological support (1)
- Facilitate discussion (2)
- Create, organize, and deliver content (3)
- Another role (please, write it here) (4) \_\_\_\_\_

Q9a When studying online, what is your preferred level of peer interaction?

- Fully asynchronous (no live interaction) (1)
- Fully synchronous (live interaction via video platforms) (2)
- Mostly asynchronous with some synchronous parts (3)
- Mostly synchronous with some asynchronous parts (4)

I don't know (5)

Q10a Using multiple interfaces for online studying (e.g., video, text, learning platforms, collaborative tools) is for you:

Very challenging (1)

Challenging (2)

Neutral (3)

Easy (4)

Very easy (5)

I don't know (6)

Q11a Having to organize different online materials and resources is for you:

Very challenging (1)

Challenging (2)

Neutral (3)

Easy (4)

Very easy (5)

I don't know (6)

Q12a Developing a good online social presence is for you:

Very challenging (1)

Challenging (2)

Neutral (3)

Easy (4)

Very easy (5)

I don't know (6)

Q13a In contrast with studying "offline," when study online, you procrastinate:

Much more (1)

- More (2)
- The same (3)
- Less (4)
- Much less (5)
- I don't know (6)

Q14a About your motivation to study online, do you typically feel:

- Very unmotivated (1)
- Unmotivated (2)
- Neutral (3)
- Motivated (4)
- Very motivated (5)
- I don't know (6)

Q15a Time management when studying online is for you:

- Very challenging (1)
- Challenging (2)
- Neutral (3)
- Easy (4)
- Very easy (5)
- I don't know (6)

Q16a What is your preferred form of assessment in online/blended learning (you can choose more than one option)

- Written assignment (1)
- Test/Exam (2)
- Presentation (3)
- Online discussion (4)
- It depends on the type of activity (7)

Q17a Please, rank the following aspects of online/blended learning from most to least challenging. Assign 1 for the most challenging and 6 for the least challenging. (Drag and drop)

- \_\_\_\_\_ Working with multiple interfaces (1)
- \_\_\_\_\_ management of multiple resources and materials (2)
- \_\_\_\_\_ Developing an online social presence (3)
- \_\_\_\_\_ Procrastination (4)
- \_\_\_\_\_ Motivation to study online (5)
- \_\_\_\_\_ Time management (6)

Q18a Please, rank the following alleged benefits of online/blended learning from most to less relevant to you. Assign 1 for most relevant and 5 to the least relevant. (Drag and drop)

- \_\_\_\_\_ Flexibility; students can study anytime, anywhere and at their own pace (1)
- \_\_\_\_\_ Level of customization/individualization of the learning materials (video, text, games, collaborative platforms, etc.) (2)
- \_\_\_\_\_ Fostering self-dependent learning (3)
- \_\_\_\_\_ Freeing lecture time for discussion and reflection (4)
- \_\_\_\_\_ Ability to cover more material in less time (5)

Q19a About your level of satisfaction with online/blended learning, you are:

- Very unsatisfied (1)
- Unsatisfied (2)
- Neutral (3)
- Satisfied (4)
- Very satisfied (5)
- I don't know (6)

Q20a Please name the two most relevant online/blended learning elements that have helped your studies.

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Q21a Please name the two most relevant online/blended learning elements that have hindered your studies.

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Skip To: End of Survey If Condition: Name the two most relevant ... is Displayed. Skip To: End of Survey.

Q4b What is your main disciplinary field:

- Business and accounting (1)
- Engineering (2)
- Arts and Humanities (3)
- Social sciences (4)
- Natural sciences (5)
- Computer science (6)
- Health sciences (7)
- Others (8)

Q5b Before the COVID-19 pandemic, you conducted your courses (you can mark more than one answer):

- 100% face to face (1)
- 100% online (2)
- Blend of online and face-to-face. (3)

Q6b During the COVID-19 pandemic, you are conducting courses (you can mark more than one answer):

- 100% face to face (1)
- 100% online (2)
- Blend of online and face-to-face. (3)

Q7b What is for you the main role of the lecturer in online/blended learning? (you can choose more than one option)

- Technological support (1)
- Facilitate discussion (2)
- Create, organize and deliver content (3)
- Another role (please, write it here) (4) \_\_\_\_\_

Q8b Creating online content is for you:

- Very challenging (1)
- Challenging (2)
- Neutral (3)
- Easy (4)
- Very easy (5)
- I don't know (6)

Q9b Having to troubleshoot technical problems in online learning is for you:

- Very annoying (1)
- Annoying (2)
- Neutral (3)
- Not annoying (4)
- Not annoying at all (5)
- I don't know (6)

Q10b When it comes to adopting new learning technologies, you are:

- Very resistant (1)
- Resistant (2)
- Neutral (3)
- Open (4)
- Very open (5)

I don't know (6)

Q11b Introducing new learning technologies that are also pedagogically sound is for you:

Very challenging (1)

Challenging (2)

Neutral (3)

Easy (4)

Very easy (5)

I don't know (6)

Q12b On the effectiveness of online learning, you are:

Very skeptical (1)

Skeptical (2)

Neutral (3)

Confident (4)

Very confident (5)

I don't know (6)

Q13b Keeping up with technological changes in online learning is for you:

Very challenging (1)

Challenging (2)

Neutral (3)

Easy (4)

Very easy (5)

I don't know (6)

Q14b Maintaining students engaged in online learning is for you:

Very challenging (1)

Challenging (2)

- Neutral (3)
- Easy (4)
- Very easy (5)
- I don't know (6)

Q15b What is your preferred form of assessment in online/blended learning (you can choose more than one option)

- Written assignment (1)
- Test/Exam (2)
- Presentation (3)
- Online discussion (4)
- It depends on the type of activity (6)

Q16b In contrast with traditional teaching, online teaching is:

- Much more time consuming (1)
- More time consuming (2)
- As time-consuming as (3)
- Less time consuming (4)
- Way less time consuming (5)

Q17b Please, rank the following challenges typically associated with online/blended learning from most to least challenging. Assign 1 for the most challenging and 6 for the least challenging. (Drag and drop)

- \_\_\_\_\_ Creating online content (1)
- \_\_\_\_\_ Troubleshoot technical problems (2)
- \_\_\_\_\_ Pedagogical and technological alignment (4)
- \_\_\_\_\_ Constant technological changes (6)
- \_\_\_\_\_ Time management (7)
- \_\_\_\_\_ Maintain students engagement (8)

Q18b Please, rank the following alleged benefits of online/blended learning, from most to less relevant to you. Assign 1 for most relevant and 5 for the least relevant. (Drag and drop)

\_\_\_\_\_ Flexibility; students can study anytime, anywhere and at their own pace (1)

\_\_\_\_\_ Level of customization/individualization of the learning materials (video, text, games, collaborative platforms, etc.) (2)

\_\_\_\_\_ Fostering self-dependent learning (3)

\_\_\_\_\_ Freeing lecture time for discussion and reflection (4)

\_\_\_\_\_ Ability to cover more material in less time (5)

Q19b Research recognized the following benefits of online/blended learning in contrast to traditional lectures. Which of these benefits do you also recognize in your students? (you can check more than one option)

Better project work (1)

Better discussion and reflection (2)

Better overall grades (3)

Covers more material (4)

No identified benefit (5)

Other benefits (if you have identified another benefit, please write it here): (6) \_\_\_\_\_

Q20b About your general level of satisfaction with online/blended learning, you are:

Very unsatisfied (1)

Unsatisfied (2)

Neutral (3)

Satisfied (4)

Very satisfied (5)

I don't know (6)

Q21b Please name the two most important elements of online learning that helped your work as a teacher.

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Q22b Please name the two most important elements of online learning that hindered your work as a teacher.

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