sustainability

MDPI

Article

Harmonizing Pedagogy and Technology: Insights into Teaching Approaches That Foster Sustainable Motivation and Efficiency in Blended Learning

Marko Radovan * and Danijela Makovec Radovan

Department of Educational Sciences, Faculty of Arts, University of Ljubljana, 1000 Ljubljana, Slovenia
* Correspondence: marko.radovan@ff.uni-lj.si

Abstract: This study aims to investigate the impact of blended learning strategies on various student outcomes in Vocational Education and Training (VET) contexts, addressing gaps in the existing literature and informing the refinement of blended learning approaches to enhance educational experiences. The main goal of the study was to explore the impact of teaching approaches used on student attitudes, satisfaction, motivation, and the workload of VET students. Data were collected from 106 students across seven VET programs through an online survey. The findings reveal that collaborative learning significantly enhances student engagement and satisfaction, while the integration of technology in blended learning environments improves educational experiences. However, challenges such as perceived overload are acknowledged. The study also highlights the critical role of assessment and feedback in fostering student satisfaction and competence. Based on these results, the study recommends enhancing collaborative learning through strategic support for diversity and technology integration and optimizing assessment and feedback mechanisms to improve engagement and reduce stress. These recommendations aim to refine blended learning strategies in VET, contributing to better educational outcomes and addressing the identified gaps in the literature.

Keywords: blended learning strategies; vocational education and training (VET); student engagement and satisfaction; technology integration in education; assessment and feedback mechanisms

Citation: Radovan, M.; Radovan, D.M. Harmonizing Pedagogy and Technology: Insights into Teaching Approaches That Foster Sustainable Motivation and Efficiency in Blended Learning. *Sustainability* **2024**, *16*, 2704. https://doi.org/10.3390/su16072704

Academic Editor: Patricio E. Ramirez-Correa

Received: 12 February 2024
Revised: 16 March 2024
Accepted: 21 March 2024
Published: 25 March 2024

1. Introduction

Blended learning, a teaching approach that merges traditional face-to-face classroom pedagogy with online educational activities, signifies a pivotal development in education [1–3]. Blended learning is defined by Garrison and Kanuka [4] as "the thoughtful integration of classroom face-to-face learning experiences with online learning experiences". This definition underscores the importance of strategic integration between different learning modalities to enhance educational outcomes. A critical component of blended learning is its ability to provide personalized learning experiences, enabling learners to control the pace, time, and place of their learning [5]. This teaching strategy promotes a more adaptable and interactive educational environment that considers the different needs and preferences of learners. The essence of blended learning lies in its ability to fuse the optimal elements of conventional classroom teaching with digital learning resources to promote a comprehensive educational experience. Originating in the fields of distance education and computer-based learning, blended learning embodies the fusion of established pedagogical methods with cutting-edge technological advances, redefining educational approaches and student engagement with subject matter.

The integration of educational technologies is central to the rise of blended learning as a leading pedagogical technique. As the technological landscape has expanded, so has the ability of educational institutions to seamlessly integrate traditional classroom instruction with online and virtual platforms. Technological innovations such as learning management systems (LMS), interactive digital content and real-time communication tools have not only

facilitated the wider adoption of blended learning, but have also refined its implementation in various educational settings [6]. This technological dynamic allows for an unprecedented level of customization of learning to a wide range of learning styles and preferences. Garrison and Vaughan [3] conceptualize the use of technology in education as a strategic and pedagogically driven integration of online and face-to-face elements. This integration seeks to enhance educational quality, promote flexibility and student engagement, and challenge outdated models. Building upon the foundational insights of Garrison and Vaughan regarding the strategic integration of technology in education, Picciano [7] further refines this approach by advocating for a precise alignment of technological tools with pedagogical objectives, emphasizing the customization and effectiveness of educational strategies to meet individual learner needs. Picciano [7] stresses that technological tools must be aligned with pedagogical, ensuring that technology serves as a means to enhance specific educational objectives rather than being an end in itself. He also emphasizes the importance of adaptive learning technologies to tailor the learning experience to individual needs, and the critical role of technology in enabling effective assessment and feedback mechanisms, essential for evaluating and advancing learner progress [7].

Despite its benefits, the implementation of blended learning is not without challenges. Infrastructure and access issues can pose significant barriers, particularly in under-resourced educational settings [8]. Additionally, Graham [5] identifies resistance from faculty and students accustomed to traditional learning environments as a potential obstacle to adoption. Successful implementation of blended learning, therefore, requires not only technological investment but also cultural change within educational institutions. As many authors have noted, these characteristics came to the fore especially during the COVID-19 pandemic [9]. Cesari et al. [9] points out that the COVID-19 pandemic has significantly influenced the use of technology in educational contexts, accelerating the transition to online and blended learning as the primary mode of education delivery. This transition is underpinned by the widespread adoption of multimedia and information technologies, alongside internet usage, which has transformed the teaching–learning process and expanded the array of available teaching options.

At this point, we should point out the age-based technology gap between teacher and students that has become increasingly apparent in the context of online learning, where both groups must engage with digital tools and platforms. In the study by Soomro et al. [10], significant inequalities in ICT access among higher education faculty in Pakistan were revealed, related to personal and positional categories, highlighting the necessity for targeted interventions to address these disparities. Many educators, who grew up in an era where technology played a less prominent role, often struggle with adapting to and effectively utilizing various digital tools and platforms required for online instruction [11]. This can manifest in a lack of proficiency with specific software or applications, unfamiliarity with online pedagogical approaches, and a general discomfort or resistance towards embracing technology as a primary mode of instruction [12]. In contrast, students belonging to younger generations, often referred to as "digital natives", have grown up surrounded by technology and tend to be more adept at navigating digital environments [13]. This disparity in technological familiarity and proficiency can lead to instructional challenges, communication barriers, equity and accessibility concerns, professional development needs, and a generational divide [11,12]. Addressing this issue requires a multifaceted approach, including ongoing professional development for educators, fostering collaboration and knowledge-sharing between generations, and promoting digital literacy and access to technology for all students [11].

Although there is an increasing interest in blended learning across different educational sectors, it is important to note a significant discrepancy in the field of vocational education and training (VET). Existing academic work shows a notable lack of empirical research specifically addressing the implementation of blended learning in VET. This deficit is critical given the particular needs and pedagogical styles of VET, which is fundamentally practical and hands-on. According to Cesari et al. [9], the development of

professional skills in vocational education is intricately linked to the engagement level of instructors and the quality of course materials. Instructor engagement in an online environment is pivotal for creating an effective learning ambiance that facilitates immediate feedback and maintains a high level of interaction, which are essential for fostering student engagement and motivation. Consequently, the application of blended learning in such contexts may present particular challenges and opportunities that have not yet been fully understood or explored.

2. Literature Review

2.1. Teaching Approaches in Blended Learning

One of the key advantages of blended learning is the flexibility it offers to students. As highlighted by Means et al. [14], blended learning can be viewed as an opportunity to redesign the instruction in a way that may improve learning outcomes for students. This flexibility allows students to access course materials and participate in online discussions at their convenience, promoting self-paced learning and accommodating diverse learning needs and life phases [15]. For blended learning to be effectively implemented, it is critical to thoughtfully consider instructional design and pedagogical strategies. Neglecting the design for effective learning can render other elements of blended learning unproductive [16]. Garrison and Kanuka [4] emphasize the importance of integrating face-to-face and online components. This integration can be achieved through various teaching strategies, such as flipped classrooms, where students engage with online materials before class, and face-to-face sessions are dedicated to interactive activities and discussions [17]. Another prominent teaching approach in blended learning is the use of active learning strategies [18]. This approach encourages student engagement, critical thinking, and problem-solving skills. In a blended learning environment, active learning can be facilitated through online discussions, collaborative projects, and problem-based learning activities [14]. Furthermore, blended learning provides opportunities for personalized and adaptive learning [19]. By leveraging online learning platforms and data analytics, instructors can tailor content and assessments to individual student needs, providing targeted feedback and support.

Several studies mention the critical importance of thoughtful instructional design and pedagogical strategies but does not delve into specific teaching methods that are most effective in a blended learning environment. This is why our research focuses on identifying how different teaching approaches tailored for blended learning can enhance learning outcomes, and what the best practices are for balancing online and in-person interactions to maximize these outcomes.

2.2. Student Attitudes toward Blended Learning

Several studies have delved into the field of blended learning and its impact on students' perception and their willingness to embrace this approach. Keržič et al. [20] conducted a study revealing that several factors, including an instructor's engagement in courses students' opinions on course materials, the effectiveness of teachers in the classroom and their acceptance of technology all contribute to enhancing the perceived value of online learning [20]. The instructional design framework is crucial in influencing student involvement within blended learning environments regarding experiences [21]. Aspects such as technology integration, learner satisfaction and performance and the overall design of the learning environment significantly shape students' attitudes towards blended learning [22]. Furthermore, a comprehensive framework combining insights from both the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) has proven capable of explaining much of the variation in China's university students' utilization of blended learning, where blended learning has been acknowledged as being influenced by factors including perceived usefulness and ease, attitudes, social expectations, and control over one's behavior [23]. A study performed by Kristl [24] also reports comparable results and uses the Unified Theory of Acceptance and Use of Technology (UTAUT) model to predict the technology acceptance of college lecturers.

While previous studies have focused on general factors influencing students' perceptions and acceptance of blended learning, they have paid less attention to how specific teaching approaches either support or hinder these perceptions. Our research aims to provide insights into creating more effective blended learning designs that foster a positive attitude towards blended learning.

2.3. Student Satisfaction in Blended Learning Environments

Ensuring that students are satisfied is crucial when assessing blended learning. Taghizadeh and Hajhosseini [25] report that students' satisfaction with blended learning is influenced by multiple factors, including their attitudes, the interaction between students and teachers and the overall quality of teaching. On the other hand, other authors point out that the quality of online activity itself contributes to perceived value of blended learning in general [26]. Li and Phongsatha [27] emphasize that information quality and its verification are variables in promoting student satisfaction and engagement in learning. Meeprom and Fakfare [28] discovered that specific aspects such as student support mechanisms, innovative curricula, industry involvement, program prestige, facilitation techniques for hybrid learning, security protocols and privacy guarantees have an impact on student satisfaction in hybrid learning environments. These findings highlight the importance of many factors in ensuring learner satisfaction and ongoing engagement in the learning process.

The literature review highlights a gap in understanding the impact of specific teaching and learning strategies on student satisfaction in blended learning. It briefly mentions general satisfaction factors but lacks depth on how instructional methods influence student experiences. Our study aims to address this through examining the effects of these strategies on satisfaction, thereby offering educators recommendations to enhance learning outcomes and student satisfaction through effective teaching practices.

2.4. The Influence of Blended Learning on Student Motivation

Although satisfaction is an important factor of motivation, there are many other determinants that shape students' engagement during their course. Studies show that blended learning environments can effectively engage students through several strategies. First, improving input from all stakeholders, including students, teachers, and the external environment, can improve student engagement in learning [29]. Second, incorporating online activities and resources, such as asynchronous online videos and activities, can create an ideal blended learning environment [30]. Thirdly, promoting socio-cultural perspectives and preparing students for professional practice can be achieved by keeping learning social and authentic [31]. It is also important to ensure that technology integration adds value by promoting higher level cognitive skills and enabling differentiated learning [32]. By integrating blended learning into the curriculum, VET institutions can improve student learning and engagement, which ultimately enhances the overall quality of education and produces better graduates.

While the review suggests that blended learning can support diverse learning needs, it does not specifically address how different elements of blended learning affect student engagement and motivation. Future research could examine the relationship between specific blended learning strategies and student motivation and engagement levels.

2.5. Blended Learning and Its Effect on Student Workload

The accomplishment of students in blended learning environments is contingent upon their perceptions of workload, which are influenced by a multitude of factors. The literature indicates the challenges associated with managing such workload, highlighting its potential negative impact on students' study behaviors. Aristeidou and Cross [33] have documented the difficulties encountered in managing workload in the context of distance learning during the COVID-19 pandemic, noting its adverse effects on study habits. Similarly, Cope and Staehr [34] found that students' perceptions of their workload could motivate them to engage more deeply with course content. Furthermore, research by Kember and Leung [35]

suggests that the allocation of class time has a greater influence on students' workload perceptions than the time spent on independent study, a finding particularly relevant in the secondary education sector, where structured timetables predominate. Kyndt et al. [36] argue that additional variables, including students' time management skills, task prioritization abilities, and the overall learning environment, also significantly affect their workload perceptions. Ibrahim and Ismail [37], as well as El Sadik and Al Abdulmonem [38], underscore the importance of carefully considering workload in the implementation of blended learning strategies to alleviate potential challenges. It is crucial, therefore, for educators to ensure that the workload in blended learning settings remains manageable, mirroring that of traditional classroom settings, to prevent adverse outcomes such as increased absenteeism, reduced motivation, and declining academic performance. Previous reviews have touched upon the notion of workload perception within blended learning environments but often fall short of a thorough exploration into how varied teaching methodologies influence student workload. Our study delves into this gap by examining the interplay between online and face-to-face elements in teaching strategies and assessing their effects on students' workload, motivation, and satisfaction.

2.6. Aims, and Research Questions of the Study

The primary objective of this research is to reveal the extant gaps within the scholarly literature concerning the implementation of blended learning methodologies in educational settings. Specifically, it seeks to delineate the correlation between students' attitudes towards blended learning environments and their perceptions of teaching approaches. Moreover, this study attempts to examine the influence of diverse teaching approaches on students' attitudes and satisfaction levels, alongside their impact on the perceived student's workload. An additional focus will be to assess how these variables contribute to differences in student motivation within learning contexts. This investigation is significant as it documents and analyzes the interplay between teaching approaches and student outcomes within blended learning, particularly in vocational education.

The primary objective of our research was to examine how does the integration of technology in blended learning environments influence pedagogical approaches and student learning outcomes. We tried to address this objective with the following research questions (RQs):

RQ1—How do students' attitudes towards blended learning correlate with their interactions with technology and perceptions of various teaching approaches?

RQ2—What relationship exists between student satisfaction with blended learning and the frequency of different technology-mediated teaching approaches?

RQ3—Which technology-supported teaching approaches are most strongly predictive of student motivation in a blended learning context?

RQ4—How do different technology-supported teaching approaches predict the perceived workload among students participating in blended learning courses?

3. Materials and Methods

3.1. Sample

The research methodology implemented in this study utilized a convenience sampling technique. The study was conducted as a part of the BlendVET project (https://blendvet.si/, accessed on 20 March 2024). This project was primarily aimed at exploring the pilot implementation of blended learning methodologies within Vocational Education and Training (VET) courses. The research included eight vocational institutions across Slovenia which were selected via a public tender process. From each participating school, two to three educators were chosen to undergo comprehensive training in blended learning strategies. This preparatory phase was designed to arm them with the requisite competencies for the design and execution of blended learning within their respective courses. The actual implementation phase of the blended learning spanned from April to June 2023. Subsequent to this period, in June 2023, an anonymous online survey was disseminated. The survey link was initially sent to the educators involved in the blended learning (BL) pilot, who then

extended the survey to their students. In the survey we acquired participation from a cohort of 106 students, comprising 98 male and 7 female respondents, with one participant electing to withhold gender information. The mean age of the participants was 17.1 years. Predominantly, the demographic composition of the sample was reflective of the study's focus on disciplines that are traditionally male dominated, such as computer, automotive, electrical, and mechanical technician fields. Participants were enrolled in high school curricula spanning four to five years, with the sample including 56 third-year students, 36 s-year students, 11 first-year students, and three fourth-year students.

3.2. Measures

The principal instrument employed in this study was an online survey, segmented into two distinct phases. The initial phase of the survey was devoted to the collection of demographic data, encompassing variables such as gender, age, educational institution, field of study, and year of study. The subsequent sections were designed to probe into students' experiences regarding the multifaceted aspects of blended learning (BL). In greater detail, this portion of the questionnaire aimed to explore pedagogical approaches within BL, students' attitudes towards blended learning, perceived workload, factors influencing motivation, and overall satisfaction with the BL course.

3.2.1. Teaching Approaches Scale

To identify the most frequently used teaching practices during blended learning, we created a scale of the ten most commonly employed approaches. To create the scale, we have utilized various studies that have examined effective and creative methods for integrating different types of learning, such as blended and hybrid approaches, in order to establish suitable categories for our scale [1,39,40]. The scale is composed of 10 statements (see "Appendix A" for the full scale) that were for the purpose of this analysis recorded in two categories of five, with the range from "1—never" to 5 "almost always". The new variables were constructed through calculating the mean of the preceding item values.

1. Synchronous Learning: This category includes live sessions where the teacher and students interact in real-time using platforms such as Zoom or Teams. Items in this category: "Live online sessions" and "Live presentations or talks by experts".
2. Asynchronous Learning: This category includes recorded presentations or instructional videos by the teacher, as well as presentations or talks by experts in the field ("Instructional videos")
3. Collaborative Learning: This category includes group projects or presentations online, as well as interaction among students in small groups or breakout rooms. ("Group projects or presentations online", "Students working in small groups")
4. Assessment and Feedback: This category includes frequent quizzes or short assignments to check the students' understanding, as well as getting online feedback, support, or guidance from the instructor. ("Frequent quizzes or assignments", "Online feedback or guidance from the teacher")
5. Technology-Enhanced Learning: This category includes activities that incorporate VR or AR technology, as well as interactive videos. (Activities including VR or AR technology ", "Activities including interactive video")

As shown in Table 1, the teaching approach of Assessment and Feedback stands out with the highest mean (M = 3.33) and a relatively low standard deviation (SD = 1.03). This indicates its widespread and consistent use in providing student evaluations and support. This is closely followed by Asynchronous Learning (M = 3.08, SD = 1.21) and Collaborative Learning (M = 3.03, SD = 1.06), both highlighting the significance of flexible learning timings and interactive group activities in modern educational practices. Surprisingly, Technology-Enhanced Learning, despite the innovative potential of VR and AR technologies, is not as prevalently adopted, with a mean of 2.53 and a higher SD of 1.13, suggesting an emerging yet inconsistent integration into teaching strategies. Synchronous learning teaching approaches also shows a moderate mean of 2.52. These results

reveal a preference for approaches that offer flexibility, interaction, and direct feedback, with a somewhat unexpected tentative adoption of advanced technological tools in education.

Table 1. Descriptive statistics for the scale of teaching approaches.

Teaching Approaches	N	M	SD
Synchronous Learning	101	2.52	1.05
Asynchronous Learning	100	3.08	1.21
Collaborative Learning	102	3.03	1.06
Assessment and Feedback	101	3.33	1.03
Technology-Enhanced Learning	100	2.53	1.13

Note: Min. = 1; Max. = 5.

The observed low average scores across various teaching approaches indicate that these pedagogical methods are infrequently employed by teachers. This outcome is of concern, as it may imply that teachers either lack familiarity with these methods or have limited experience in implementing them.

3.2.2. Attitudes towards BL

The scale used in the survey on attitudes towards blended learning was based on a scale introduced by Hassan Ja'ashan [41] and comprised six statements designed to measure students' perceptions of blended learning environments. The statements covered a range of aspects, including the comparative suitability of blended learning versus traditional face-to-face teaching, the ease of maintaining motivation, and others. The aim of this scale was to capture a comprehensive understanding of student attitudes towards blended learning and to highlight areas of strength and areas for improvement.

Respondents were asked to indicate their level of agreement with each statement on a 5-point Likert scale, with a score of 1 indicating "strongly disagree" and a score of 5 indicating "strongly agree".

As seen in Table 2, the descriptive results regarding respondents' perceptions of different aspects of blended learning range from 3.27 to 3.53. This range suggests a generally positive attitude towards blended learning. The highest score, 3.53, indicates that respondents find it relatively easy to maintain motivation in a blended learning environment, highlighting an interesting aspect of student engagement outside of the traditional classroom. In contrast, the lowest score of 3.27 for the statement that blended learning helped respondents to learn more effectively indicates a slightly less positive assessment of the effectiveness of blended learning in improving learning outcomes.

Table 2. Descriptive statistics for the scale of students' attitudes toward blended learning.

Attitudes toward BL	N	M	SD
I prefer blended over face-to-face learning		3.32	1.19
Maintaining motivation in blended learning is easy		3.53	1.12
I gained equivalent knowledge from blended learning		3.41	1.16
My vocational skills improved with blended learning		3.45	1.00
Blended learning enhances collaboration		3.37	1.08
Blended learning improved my learning effectiveness		3.27	1.14

Note: Min. = 1; Max. = 5.

3.2.3. Perceived Workload

We used the "NASA Task Load Index" (NASA-TLX), a sound assessment tool, to quantify the cognitive and emotional load that students experience during academic tasks. The NASA-TLX is a comprehensive assessment tool designed to measure the subjective workload of individuals based on six essential parameters [42].

For the purposes of our investigation, we have selected four of the original six components that are particularly relevant to the academic context:

1. Mental demand: This dimension captures the cognitive effort required to accomplish a certain task, which may include activities such as thinking, deciding, calculating, and remembering.
2. Temporal demand: This item evaluates the perceived time pressure experienced by students, which encompasses the sense of urgency in meeting certain time limitations.
3. Effort: This item measures the extent of mental and physical effort required for the individual to achieve his or her level of performance.
4. Frustration level: This measure assesses the extent to which an individual felt insecure, discouraged, irritated, stressed, and annoyed during the task.

Students were asked to express their level of agreement or disagreement with the statements using a 5-point Likert scale that ranged from "1—strongly disagree" to "5—strongly agree" (the original scale was coded from 0 to 4, but for easier comparison with other scales we have converted it to a 1 to 5 scale). Descriptive statistics for this scale are presented in Table 3.

Table 3. Descriptive statistics for the perceived workload scale.

Perceived Workload	N	M	SD
I found it difficult to complete my tasks on time in the online activity	95	3.19	1.19
I had to work hard to do as well as I did in the online activity	96	3.06	1.01
I felt unmotivated, annoyed, stressed, or irritated during the online activity	96	2.79	1.30
The online activity was a challenge for me	96	2.51	0.98

Note: Min. = 1; Max. = 5.

When analyzing the different factors affecting students during assignments, time pressure emerges as the greatest concern with the highest mean (M = 3.19) and one standard deviation (SD = 1.19), indicating significant variability in students' perceptions of time pressure and urgency. Effort, which includes cognitive and physical effort as well as emotional energy, follows closely behind with a mean of 3.06 and SD of 1.01, indicating the considerable commitment required of students. Surprisingly, despite its crucial role in understanding the cognitive complexity of the tasks, mental demand has the lowest mean (M = 2.51) with a relatively low SD (0.98), indicating a more consistent perception of cognitive effort across tasks. The level of frustration, with a mean of 2.79 and the highest SD of 1.30, indicates a wide range of emotional experiences among students, from stress to irritation, yet does not dominate the landscape of perceived challenges. These findings highlight the primary concern of time management for students while also indicating that emotional factors such as frustration exhibit the greatest variability, suggesting a nuanced interplay between cognitive demands and emotional resilience in the academic environment.

3.2.4. Student Motivation

We evaluated the influence of teaching strategies on student motivation by employing specific components of the Intrinsic Motivation Inventory—IMI [43], a tool that has undergone many rounds of examination and validation in previous studies [44–46]. For the purposes of our research, we utilized a modified version of the IMI questionnaire, which originally comprises 45 items across 7 subscales. Specifically, we selected 4 scales from the original Intrinsic Motivation Inventory (IMI) questionnaire, resulting in a total of 16 items for our study (see "Appendix A" for the full scale).

These scales are:

1. Interest/Enjoyment (IMI-I) is a self-reported assessment comprising four items. For example, one such item is "I would describe BL as very interesting".
2. Perceived Competence (IMI-C) has a positive correlation with both self-reported and behavioral indicators of intrinsic motivation. It comprises four items, such as "After participating in BL for a while, I felt pretty competent".

3. Value/Usefulness (IMI-V) subscale assesses the extent to which a person's intrinsic motivation is positively affected when they see activities as important or beneficial. The subscale has four questions, including the statement "I believe activities in BL could be of some value".
4. Effort/Importance (IMI-E) subscale quantifies the significance of an activity in relation to motivation. It consists of four items, such as "I put a lot of effort into this BL course".

Students indicated their level of agreement with each statement using a 5-point Likert scale, ranging from "1—strongly disagree" to "5—strongly agree". Descriptive statistics for the scales used are presented below Table 4.

Table 4. Descriptive statistics for the student's motivation scale.

Perceived Motivation (Scales)	N	M	SD
Interest/Enjoyment (IMI-I)	93	3.66	0.99
Perceived competence (IMI-C)	93	3.66	1.02
Value/Usefulness (IMI-V)	93	3.60	1.03
Effort/Importance (IMI-E)	94	3.41	1.02

Note: Min. = 1; Max. = 5.

The data shed light on the aspects of intrinsic motivation, with interest/enjoyment and perceived competence each having the highest mean score (M = 3.66). This indicates a strong sense of engagement and competence among students during the course. Value/usefulness follows closely behind with a mean score of 3.59, showing how important it is to recognize the relevance and usefulness of activities to further increase motivation. Effort/Importance with a mean of 3.41 is slightly lower, but still shows a high level of engagement and perceived importance of the course activities.

3.2.5. Satisfaction with BL Course

A satisfaction scale was also used in the survey conducted, which included ten different statements on various aspects of the students' educational experience. In order to assess student satisfaction with blended learning course, we have adapted the 'Online Course Satisfaction Scale' [47]. The scale consists of 10 items, which we have adapted and translated into Slovenian. Students were asked to indicate their level of satisfaction on a 5-point Likert scale. This scale ranged from 1, meaning "I was not satisfied at all", to 5, meaning "I was very satisfied". To improve the clarity and depth of our analysis and interpretation in this paper, we grouped these variables into five different categories according to their content similarity, which we explain below. The new variables were created by averaging the values of the original items (see "Appendix A" for the full scale).

1. Instructional Quality and Relevance: This category focuses on the main objectives of providing quality instruction that is directly applicable to job skills and activities. Items in this category include: "The overall quality of the blended learning course", "The relevance and usefulness of the course for developing my vocational knowledge and skills", and "The chances to practice and apply the vocational skills we learned".
2. Interaction and Engagement: This category emphasizes the social dimensions of learning, highlighting the importance of interaction and engagement with both instructors and peers. Items in this category are "The level of interaction and engagement with my teachers and classmates in the course", "The level of support and guidance provided by my teachers in the blended learning course", and "The opportunities for collaboration and teamwork in the blended learning course".
3. Course Design and Balance: This category examines the structural components of the blended learning course, specifically focusing on the balance between online and face-to-face learning elements and the level of personalization. Items in this category include "The balance between online and face-to-face learning in the course" and "The level of personalization in the blended learning course".

4. Technological Aspects: This singular but significant category addresses the employment of technology within the blended learning environment. The item in this category is "The use of technology and multimedia in the blended learning course".
5. Learning-to-learn Skill Development: Focusing on the metacognitive aspect of learning, this category is dedicated to how the course supports the development of 'learning to learn' skills. The item in this category is "The level of support for developing my learning-to-learn skills during the blended learning course".

The descriptive statistics for the satisfaction scale can be found in Table 5.

Table 5. Students' satisfaction with blended learning.

Satisfaction with BL	N	M	SD
Instructional Quality and Relevance	88	3.62	0.91
Interaction and Engagement	87	3.70	0.83
Course Design and Balance	87	3.66	0.88
Technological Aspects of BL	86	3.80	1.00
Learning-to-learn Skill Development	86	3.67	1.02

Note: Min. = 1; Max. = 5.

The descriptive results of this scale reflect the positive perception of the blended learning experience in various dimensions. The average values on a scale of 1 to 5 show above-average satisfaction in all categories: Instructional Quality and Relevance (3.62), Interaction and Engagement (3.70), Course Design and Balance (3.66), Technological Aspects (3.80), and Learning-to-learn Skill Development (3.67). These scores suggest that students generally found the instructional content relevant and of high quality.

3.3. Data Analysis

Data analysis was performed using SPSS 27. This involved a correlation analysis to identify the relationships between various variables, alongside linear regression analyses aimed at evaluating the influence of teaching approaches on students' perceived workload and motivation.

4. Results

4.1. Correlation between Student Attitudes and Teaching Approaches

The correlation analysis in Table 6 provides a detailed overview of the relationship between students' attitudes towards blended learning and the different teaching approaches used during blended learning.

Table 6. Pearson correlation coefficients for attitudes toward blended learning and teaching approaches.

Teaching Approaches	PREFER	MOTIV	KNOW	VSKILL	COLLAB	EFFECT
Synchronous Learning	0.09	0.11	0.09	0.16	0.18	0.19
Asynchronous Learning	0.07	0.00	0.04	0.17	0.17	0.03
Collaborative Learning	0.31 ***	0.37 ***	0.24 *	0.35 ***	0.40 ***	0.35 ***
Assessment and Feedback	0.33 ***	0.37 ***	0.29 **	0.26 *	0.36 ***	0.33 ***
Technology-Enhanced Learning	0.32 ***	0.19	0.30 ***	0.33 ***	0.28 **	0.40 ***

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; PREFER = blended learning is preferred over face-to-face learning; MOTIV = maintaining motivation in blended learning tends to be easy; KNOW = equivalent knowledge is gained from blended learning; VSKILL = vocational skills tend to improve with blended learning; COLLAB = blended learning enhances opportunities for collaboration; EFFECT = blended learning improves learning effectiveness.

The results from Table 6 indicate that collaborative learning has the most significant positive correlation with various aspects of attitudes toward blended learning, particularly in possibilities for enhanced collaboration with other students and the teacher ($r = 0.40$, $p < 0.001$), preference for blended learning over face-to-face instruction ($r = 0.31$, $p < 0.001$), and maintaining motivation ($r = 0.37$, $p < 0.001$). This highlights the critical role that collaborative learning plays in enhancing students' engagement and positive perceptions

of blended learning environments. Interestingly, while synchronous and asynchronous learning methods show relatively weak correlations with positive attitudes toward blended learning, technology-enhanced learning shows a strong positive impact on improved learning effectiveness ($r = 0.40$, $p < 0.001$), underscoring the importance of incorporating technology in fostering effective learning experiences, and improving students' vocational skills ($r = 0.33$, $p < 0.001$). The relatively lower correlation of asynchronous learning with motivation maintenance is surprising, suggesting that asynchronous activities alone may not be sufficient to keep students motivated in blended learning settings. The analysis of Cohen's d for these correlations revealed effect sizes ranging from 0.10 to 0.16, which falls within the very small effect category according to Cohen's interpretation [48]. Despite this, these findings emphasize the need for incorporating collaborative and technology-enhanced learning approaches to maximize the benefits of blended learning, particularly in improving learning effectiveness, skill development and equal knowledge gained.

4.2. Teaching Approaches Correlation with Student Satisfaction

The data presented in Table 7 demonstrate the relationship between satisfaction with blended learning and methods of instruction.

Table 7. Pearson correlation coefficients for dimensions of satisfaction with blended learning and teaching approaches.

Teaching Approaches	Quality/ Relevance	Interaction/Engagement	Course Design	Technological Aspect
Synchronous Learning	0.02	0.14	0.16	−0.01
Asynchronous Learning	0.07	0.13	0.21	−0.05
Collaborative Learning	0.24 *	0.26 *	0.24 **	0.01
Assessment and Feedback	0.41 ***	0.57 ***	0.43 ***	0.30 **
Technology-Enhanced Learning	0.26 *	0.21	0.18	0.12

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

The table showcases Pearson correlation coefficients between dimensions of satisfaction with blended learning and various teaching approaches. A standout observation is the strong positive correlation between assessment and feedback and both instructional quality and relevance ($r = 0.41$, $p < 0.001$), course design ($r = 0.43$, $p < 0.001$) and interaction and engagement ($r = 0.57$, $p < 0.001$). This underscores the pivotal role of regular assessment and feedback in enhancing student satisfaction, particularly in fostering a perception of instructional quality and actively engaging students in the learning process. It should be noted, however, that the effect size coefficients for these three correlations are between d = 0.17 and d = 0.33, indicating a very small to small effect [48]. The correlation between collaborative learning and interaction and engagement ($r = 0.26$, $p < 0.05$) also merits attention, indicating that collaborative learning contributes significantly to student engagement and satisfaction. The effect size, in this case is d = 0.62, indicating a very small effect. Interestingly, technological aspects show a very weak or even slightly negative correlation with synchronous and asynchronous learning, suggesting that the mere presence of technology does not guarantee satisfaction with these learning modalities. The strongest correlations found with assessment and feedback highlight the critical importance of effective evaluation and constructive feedback in optimizing student satisfaction in blended learning environments.

4.3. Teaching Approaches as Predictors of Student Motivation

Table 8 presents the combined and summarized results of four linear regressions, in which we attempted to determine the influence of each teaching approach on learning motivation: interest/enjoyment, effort/importance, perceived competence, and value/benefit.

Table 8. Teaching approaches as predictors of learning motivation: results from linear regression.

Independent Variables	Dependent Variables			
	IMI-I	**IMI-E**	**IMI-C**	**IMI-V**
Synchronous Learning	−0.23 *	0.10	−0.12	−0.20
Asynchronous Learning	0.07	−0.14	−0.09	0.14
Collaborative Learning	0.06	0.23 *	0.18	−0.05
Assessment and Feedback	0.33 **	0.14	0.43 ***	0.42 ***
Technology-Enhanced Learning	0.19	0.11	0.04	0.14
R^2	0.19	0.18	0.24	0.22
F	4.10 **	3.91 **	5.53 ***	4.91 ***

Note: The displayed values in the table represent standardized β weights. $N = 93$. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; IMI-I = "Interest/Enjoyment", IMI-E = "Effort/Importance", IMI-C = "Perceived Competence", IMI-V = "Value/Usefulness".

All models are statistically significant. Their predictive value, however, is relatively low (R^2 values range from 0.18 to 0.22), which is expected given the small number of predictive variables used. Teaching approach is only one of the possible motivational factors. According to our analysis, the teaching approach can most easily explain the perception of competence (24% of explained variance) and the assessment of the course content (22% of explained variance). In both cases, the most important teaching approach to increase student motivation is giving frequent assessment and feedback on students' performance. This teaching approach impacted perceived competence ($\beta = 0.43$, $p < 0.001$) and perception of the relevance of learning ($\beta = 0.42$, $p < 0.001$). This (again) underlines the crucial role of effective feedback in making students feel competent and value the blended learning activities. Interestingly, synchronous learning has a negative impact on interest and enjoyment ($\beta = -0.23$, $p < 0.05$) and perceived value of learning ($\beta = -0.20$; $p < 0.01$), suggesting a limited ability to engage students or convey the value of real-time sessions. Conversely, collaborative learning has a positive effect on increased learning effort ($\beta = 0.23$, $p < 0.05$), indicating that the introduction of group work or a student project can significantly increase student effort. Technology-enhanced learning and asynchronous learning teaching approaches have mixed effects, suggesting that while technology is beneficial, it does not uniformly increase motivation. Meaningful assessment and attentive feedback are therefore the most important factors in motivating students in blended learning environments.

4.4. Teaching Approaches and Their Influence on Perceived Workload

The regression analysis in Table 9 explores how different teaching approaches predict students' workload, focusing on mental demand (MD), temporal demand (TD), effort (EF), and frustration level (FL). In the table below, we present summarized results of four linear regressions that aimed to determine the impact of teaching approaches on perceived students' workload.

Table 9. Teaching approaches as predictors of perceived workload: results from linear regression.

Independent Variables	Dependent Variables			
	Mental Demand	**Temporal Demand**	**Effort**	**Frustration Level**
Synchronous Learning	0.40 ***	0.12	0.24 *	0.36 **
Asynchronous Learning	−0.11	0.27 **	0.12	0.18
Collaborative Learning	−0.12	−0.10	−0.07	−0.03
Assessment and Feedback	−0.09	−0.23 *	−0.16	−0.28 **
Technology-Enhanced Learning	0.19	0.10	0.16	0.01
R^2	0.17	0.12	0.11	0.16
F	3.72 **	2.36 *	2.19 *	3.46 **

Note: The displayed values in the table represent standardized β weights. $N = 93$. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 9 demonstrates that while the regression models hold statistical significance, their capacity to explain the variance in students' perceived workload is limited. Specifically, teaching approaches account for only 11% of the variation in Effort and 17% in Mental demand, indicating a modest influence on students' work overload. Despite the limitations, the findings offer intriguing insights. Statistical analyses have shown that synchronous learning significantly amplifies cognitive load ($\beta = 0.40$, $p < 0.001$) and frustration ($\beta = 0.36$, $p < 0.01$). This suggests that real-time, interactive educational sessions can substantially elevate both the mental effort required from students and their levels of emotional stress. On the other hand, asynchronous learning impacts an increase in time management stress ($\beta = 0.27$, $p < 0.01$), suggesting that interaction with recorded content could intensify the challenges of managing time effectively. Conversely, the process of assessment and feedback is shown to reduce feelings of frustration ($\beta = -0.28$, $p < 0.01$), indicating that the provision of frequent quizzes and assignments, together with online feedback, can help lessen students' emotional discomfort. These outcomes underscore the significant role of synchronous learning in increasing mental demand and frustration, whereas asynchronous learning primarily affects time management stress. On the other hand, assessment and feedback practices are beneficial in diminishing levels of frustration, highlighting the nuanced relationship between different educational strategies and the perceived academic burden on students.

5. Discussion

Our study examined how collaborative and technology-based teaching approaches impact student engagement, satisfaction, and workload in blended learning environments. The key findings are summarized below.

Collaborative Teaching Approaches and Student Motivation: The relationship between collaborative teaching approaches and positive attitudes towards blended learning—including support, preference, and motivation—highlights the effectiveness of collaborative methods in increasing student engagement and fostering positive perceptions. Research indicates that blending online elements with teacher interaction enhances high school students' motivation across subjects. According to some studies, effective implementation requires clear guidelines, technological reliability, and active teacher engagement. Additionally, practical simulations and experiments are key in stimulating student interest [49]. Although teacher participation is vital in blended learning success, motivation also hinges on online resource accessibility and peer interaction opportunities [50]. These findings are consistent with our research that collaborative learning significantly increases learners' positive attitudes towards blended learning. Nevertheless, it is pertinent to point out that some research has highlighted the challenges associated with collaborative learning, such as issues of group dynamics and the impact of the digital divide on participation [51], although these aspects were not the focus of the present study.

Technological Integration and Its Impact on Students' Attitudes: Numerous studies have documented the effects of technological utilization on students' perception or attitudes about the course. It can increase students' positive perceptions by providing tools and applications that engage them in both formal and informal settings [52]. Technology, including virtual reality and augmented reality, creates engaging and interactive learning experiences that boost student interest and motivation, according to Muthmainnah et al. [53]. These results are consistent with our research, where it was also observed that perceptions of blended learning environments incorporating technology were notably favorable, and where the use of advanced technological tools was associated with positive evaluations of several dimensions of attitudes towards blended learning. This correlation, however, is not immediately apparent. Extant literature indicates that attitudes towards the integration of technology in educational settings frequently correlate with perceptions regarding accessibility, usability, and ease of use [23,24,54].

Assessment Practices and Their Influence on Student Satisfaction: The correlation between assessment and feedback with quality, relevance and student engagement high-

lights the importance of assessment practices and constructive feedback. These elements are critical to student satisfaction as they provide them with a sense of progression, competence, and relevance throughout their educational journey. The regression analysis further substantiates this by showing the impact of frequent assessment and feedback on several aspects of motivation, e.g., perceived competence and relevance of learning. The critical role of assessment and feedback in promoting quality and engagement is well documented [55], and our findings highlight its importance in learning environments. Despite the emphasis on the positive aspects, some studies point to the challenges associated with feedback, such as its timeliness and perceived usefulness by students [56].

Impacts of Asynchronous and Synchronous Learning: The differences between asynchronous and synchronous learning show different effects on student motivation and perceived workload. Synchronous learning is our research associated with increased mental demands and frustration and provides limited opportunities for students to engage or demonstrate value in real-time sessions. Conversely, asynchronous learning increases flexibility but (at least in our study) does not contribute significantly to motivation, suggesting that additional pedagogical strategies are required to fully engage students. The literature acknowledges the benefits of asynchronous learning in terms of flexibility and self-directed learning [57,58], but also points to its limitations in fostering community and providing immediate feedback, which is reflected in our findings. Although synchronous learning has been cited for its potential for real-time interaction and engagement [59], our findings are in line with studies that stress potential fatigue, stress, or lack of motivation after frequent synchronous meetings [60].

Psychological and Emotional Workload in Blended Learning Contexts: The effects on mental and emotional workload suggest that the blended learning approach may influence students' psychological and emotional distress. Participation in synchronous learning increases demands and frustration due to the need for real-time participation, while asynchronous learning requires effective time management. However, assessment and feedback mechanisms can alleviate frustration, suggesting that well-designed assessments can mitigate some of the emotional distress associated with learning. Previous research has highlighted the potential for increased workload and stress in learning scenarios, particularly when synchronous components are involved [60]. Our observations are consistent with these findings on emotional workload and continue the debate on how different aspects of learning either exacerbate or mitigate workload and stress. Some studies suggest that strategically designed asynchronous activities can mitigate these challenges, which is consistent with our discussion of assessment and feedback [61,62].

Some methodological limitations must be accredited in connection with this study. Using convenience sampling and an online survey targeting a specific group limits the applicability of the study to a wider audience. The overwhelming majority of male respondents from technical departments may not reflect the diverse perspectives on blended learning found across the student body. Furthermore, the reliance on self-reporting may lead to biases that cast doubt on the accuracy and trustworthiness of the data collected. Possible other limitations, such as time constraints, the digital divide and privacy concerns, should also be acknowledged. The digital divide is not only about physical access to technology, but also about the skills and competencies required to use it effectively. VET students from disadvantaged backgrounds may find it difficult to access or use digital resources, which may affect their attitudes and motivation towards blended learning. In addition, students' attitudes and motivations towards blended learning can be very dynamic and influenced by different educational practices. It is important to note that a study conducted at one point in time may not capture these temporal changes, which may limit the relevance and applicability of the findings over time. Finally, research involving students during their school years, particularly in the digital domain, raises concerns about the confidentiality of their data. Confidentiality of responses may affect students' willingness to participate or the honesty of their responses, which could skew the data collected.

6. Conclusions

Our study contributes to the understanding of how teaching approaches in blended learning impact student attitudes, commitment, motivation, and workload. We highlight the effectiveness of learning in increasing engagement and fostering educational attitudes, despite the challenges posed by group dynamics and the digital divide. Additionally, our research emphasizes the role of technology in enhancing experiences while recognizing potential drawbacks, such as information overload. The importance of assessment and feedback in showcasing their influence on students' sense of progress and engagement is emphasized, despite concerns about their timeliness and usefulness. Our findings suggest that while asynchronous methods offer flexibility and self-paced learning opportunities, synchronous sessions may induce stress without improving motivation. This indicates a need for innovation in teaching methods. Furthermore, our study examines the psychological effects of learning. We recommend implementing designed assessments and asynchronous activities to reduce stress and improve learning experiences. In conclusion, our research suggests exploring ways to optimize blended learning environments by prioritizing strategies that meet learner needs and enhance both asynchronous learning opportunities and technology integration in education.

Moving forward, future research on blended learning, particularly in the field of vocational education and training, should focus on three main areas. First, the use of a broader and more inclusive sampling strategy is essential to ensure that the results are representative of the diverse group of vocational students. This will address the limitations of the current study in terms of demographic coverage. Exploring innovative methods of assessing and providing feedback in blended learning environments can provide valuable insights into improving student engagement and learning outcomes. Investigating teaching techniques that maximize engagement and learning in both asynchronous and synchronous modalities in vocational education is critical. This research will provide useful evidence on how to balance the flexibility of asynchronous learning with the immediacy and interaction of synchronous sessions. This will reduce the psychological and emotional stress identified in the current study.

Blended learning presents a promising approach to education, yet it faces significant challenges that must be addressed to unlock its full potential. These include overcoming deficits in student motivation, navigating technological limitations, and ensuring adequate faculty preparation. The optimization of blended learning goes beyond the mere strategic reconfiguration of course content and the selection of the appropriate delivery mode—whether online or in-person—for various learning activities. It also crucially involves the enhancement of student engagement throughout their education. To ensure the effective implementation of blended learning, it is essential to undertake meticulous planning and provide comprehensive training and support for faculty, coupled with ongoing evaluation efforts. Such measures are vital for fostering an environment that promotes student achievement and success.

Author Contributions: Conceptualization, M.R. and D.M.R.; methodology, M.R.; validation, D.M.R. and M.R.; formal analysis, M.R.; investigation, D.M.R. and M.R.; resources, D.M.R. and M.R.; data curation, M.R.; writing—original draft preparation, M.R.; writing—review and editing, D.M.R. and M.R.; visualization, D.M.R. and M.R.; supervision, D.M.R.; project administration, D.M.R. and M.R.; funding acquisition, D.M.R. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by EEA Grants, grant number ATP213 and the Slovenian Research and Innovation Agency (ARIS), research program P5-0174.

Institutional Review Board Statement: In Slovenia, educational research that uses opinion polls is not subject to the approval of an ethics committee. However, as researchers, we are committed to upholding the highest ethical standards in our work. The data for this study were collected through an anonymous online survey, which was completed voluntarily and kept confidential.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data will be made available upon request.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Appendix A. Scales Used in The Research

Teaching Approaches Scale
During the blended learning pilot, how often did your course(s) include the following?

1. Online live sessions including the teacher and students (e.g., via Zoom, Teams).
2. Pre-recorded presentations or instructional videos by the teacher.
3. Presentations or talks by experts in the field (live or recorded).
4. Group projects or presentations online.
5. Interaction among students in small groups or breakout rooms.
6. Frequent quizzes or short assignments to check your understanding.
7. Activities including VR or AR technology.
8. Activities including interactive video.
9. Online coursework that challenges you to enhance your vocational knowledge and skills.
10. Getting online feedback, support, or guidance from the instructor.

Attitudes Towards Blended Learning Scale
To what extent do you agree with the following statements?

1. I support the use of blended learning in my course.
2. Blended learning generally suits me better than face-to-face tuition.
3. It is easy to maintain motivation to study in blended learning.
4. I gained the same knowledge in blended learning as I did in face-to-face tuition.
5. I have the appropriate ICT skills to participate in blended learning.
6. Blended learning in my course improved my vocational skills.
7. Blended learning gives me the chance to collaborate with other students and teachers more.
8. Blended learning helped me to learn more effectively.

Perceived Workload Scale
To what extent do you agree with the following statements?

1. The online activity was a challenge for me.
2. I found it difficult to complete my tasks on time in the online activity.
3. I had to work hard to do as well as I did in the online activity.
4. I felt unmotivated, annoyed, stressed or irritated during the online activity.

Student Motivation Scale
To what extent do you agree with the statements:

1. I thought blended learning was quite enjoyable.
2. I put a lot of energy into activities during this blended learning course.
3. I believe activities in blended learning could be of some value.
4. I would describe blended learning as very interesting.
5. I am satisfied with my performance at blended learning.
6. I think I did pretty well at blended learning, compared to other students.
7. I believe learning in blended learning could be beneficial to me.
8. I tried very hard on activities in this blended learning course.
9. After participating in blended learning for a while, I felt pretty competent.
10. I think I am pretty good at blended learning.
11. I put a lot of effort into this blended learning course.
12. It was important to me to do well at this blended learning course.
13. I would be willing to do blended learning again.
14. While I was doing this blended learning, I was thinking about how much I enjoyed it.
15. I enjoyed doing blended learning very much.
16. I think that activities we did in blended learning are important for me.

Satisfaction with BL Course Scale

How satisfied were you with the following characteristics of the blended learning course you completed?

1. The overall quality of the blended learning course.
2. The balance between online and face-to-face learning in the course.
3. The level of interaction and engagement with my teachers and classmates in the course.
4. The relevance and usefulness of the course for developing my vocational knowledge and skills.
5. The level of support and guidance provided by my teachers in the blended learning course.
6. The chances to practice and apply the vocational skills we learned.
7. The level of personalization in the blended learning course.
8. The use of technology and multimedia in the blended learning course.
9. The level of support for developing my learning-to-learn skills during the blended learning course.
10. The opportunities for collaboration and teamwork in the blended learning course.

References

1. O'Byrne, W.I.; Pytash, K.E. Hybrid and Blended Learning. *J. Adolesc. Adult Lit.* **2015**, *59*, 137–140. [CrossRef]
2. Ashraf, M.A.; Yang, M.; Zhang, Y.; Denden, M.; Tlili, A.; Liu, J.; Huang, R.; Burgos, D. A Systematic Review of Systematic Reviews on Blended Learning: Trends, Gaps and Future Directions. *Psychol. Res. Behav. Manag.* **2021**, *14*, 1525–1541. [CrossRef] [PubMed]
3. Garrison, D.R.; Vaughan, N.D. *Blended Learning in Higher Education: Framework, Principles, and Guidelines*; The Jossey-Bass higher and adult education series; Jossey-Bass: San Francisco, CA, USA, 2008.
4. Garrison, D.R.; Kanuka, H. Blended Learning: Uncovering Its Transformative Potential in Higher Education. *Internet High. Educ.* **2004**, *7*, 95–105. [CrossRef]
5. Graham, C.R. Blended Learning Systems: Definition, Current Trends and Future Directions. In *The Handbook of Blended Learning: Global Perspectives, Local Designs*; Bonk, C.J., Graham, C.R., Eds.; Pfeiffer Publishing: San Francisco, CA, USA, 2006; pp. 3–21.
6. Güzer, B.; Caner, H. The Past, Present and Future of Blended Learning: An in Depth Analysis of Literature. *Procedia-Soc. Behav. Sci.* **2014**, *116*, 4596–4603. [CrossRef]
7. Picciano, A.G. Theories and Frameworks for Online Education: Seeking an Integrated Model. *Online Learn.* **2017**, *21*, 166–190. [CrossRef]
8. Zhao, Y.; Pugh, K.; Sheldon, S.; Byers, J.L. Conditions for Classroom Technology Innovations. *Teach. Coll. Rec.* **2002**, *104*, 482–515. [CrossRef]
9. Cesari, V.; Galgani, B.; Gemignani, A.; Menicucci, D. Enhancing Qualities of Consciousness during Online Learning via Multisensory Interactions. *Behav. Sci.* **2021**, *11*, 57. [CrossRef] [PubMed]
10. Soomro, K.A.; Kale, U.; Curtis, R.; Akcaoglu, M.; Bernstein, M. Digital Divide among Higher Education Faculty. *Int. J. Educ. Technol. High. Educ.* **2020**, *17*, 21. [CrossRef]
11. Ertmer, P.A.; Ottenbreit-Leftwich, A.T. Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect. *J. Res. Technol. Educ.* **2010**, *42*, 255–284. [CrossRef]
12. Lawless, K.A.; Pellegrino, J.W. Professional Development in Integrating Technology Into Teaching and Learning: Knowns, Unknowns, and Ways to Pursue Better Questions and Answers. *Rev. Educ. Res.* **2007**, *77*, 575–614. [CrossRef]
13. Gallardo-Echenique, E.E.; Marqués-Molías, L.; Bullen, M.; Strijbos, J.-W. Let's Talk about Digital Learners in the Digital Era. *Int. Rev. Res. Open Distrib. Learn.* **2015**, *16*, 156–187. [CrossRef]
14. Means, B.; Toyama, Y.; Murphy, R.; Baki, M. The Effectiveness of Online and Blended Learning: A Meta-Analysis of the Empirical Literature. *Teach. Coll. Rec.* **2013**, *115*, 1–47. [CrossRef]
15. Müller, C.; Mildenberger, T. Facilitating Flexible Learning by Replacing Classroom Time with an Online Learning Environment: A Systematic Review of Blended Learning in Higher Education. *Educ. Res. Rev.* **2021**, *34*, 100394. [CrossRef]
16. Tan, S.C.; Bound, H.; Wang, X. Finding the Right Blend: Bringing Learning Back to Blended Learning. In *Blended Learning for Inclusive and Quality Higher Education in Asia*; Lim, C.P., Graham, C.R., Eds.; Springer Nature: Singapore, 2021; pp. 249–265.
17. Bergmann, J.; Sams, A. *Flip Your Classroom: Reach Every Student in Every Class Every Day*; International Society for Technology in Education: Eugene, OR, USA, 2012.
18. Bonwell, C.C.; Eison, J.A. *Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports*; ERIC Clearinghouse on Higher Education: Washington, DC, USA, 1991.
19. Patrick, S.; Kennedy, K.; Powell, A. *Mean What You Say: Defining and Integrating Personalized, Blended and Competency Education*; International Association for K-12 Online Learning (iNACOL): Vienna, VA, USA, 2013; p. 37.
20. Keržič, D.; Alex, J.K.; Alvarado, R.P.B.; Bezerra, D.d.S.; Cheraghi, M.; Dobrowolska, B.; Fagbamigbe, A.F.; Faris, M.E.; França, T.; González-Fernández, B.; et al. Academic Student Satisfaction and Perceived Performance in the E-Learning Environment during the COVID-19 Pandemic: Evidence across Ten Countries. *PLoS ONE* **2021**, *16*, e0258807. [CrossRef] [PubMed]

21. Barbosa, M.W. Students' Perceptions of an Extensive Blended Learning Implementation: The Effects of Instructional Design and Interaction. *Interact. Learn. Environ.* **2022**, *30*, 1–20. [CrossRef]
22. Min, W.; Yu, Z. A Systematic Review of Critical Success Factors in Blended Learning. *Educ. Sci.* **2023**, *13*, 469. [CrossRef]
23. Yu, T.; Dai, J.; Wang, C. Adoption of Blended Learning: Chinese University Students' Perspectives. *Humanit. Soc. Sci. Commun.* **2023**, *10*, 390. [CrossRef]
24. Kristl, N. Adoption and use of the information and communications technology. *Stud. Adult Educ. Learn.* **2016**, *22*, 7–28. [CrossRef]
25. Taghizadeh, M.; Hajhosseini, F. Investigating a Blended Learning Environment: Contribution of Attitude, Interaction, and Quality of Teaching to Satisfaction of Graduate Students of TEFL. *Asia-Pac. Educ. Res.* **2021**, *30*, 459–469. [CrossRef]
26. Seo, Y.-J.; Um, K.-H. The Role of Service Quality in Fostering Different Types of Perceived Value for Student Blended Learning Satisfaction. *J. Comput. High. Educ.* **2023**, *35*, 521–549. [CrossRef]
27. Li, C.; Phongsatha, T. Satisfaction and Continuance Intention of Blended Learning from Perspective of Junior High School Students in the Directly-Entering-Socialism Ethnic Communities of China. *PLoS ONE* **2022**, *17*, e0270939. [CrossRef] [PubMed]
28. Meeprom, S.; Fakfare, P. Blended Learning: Examining Must-Have, Hybrid, and Value-Added Quality Attributes of Hospitality and Tourism Education. *J. Hosp. Tour. Educ.* **2023**, *35*, 1–15. [CrossRef]
29. Li, L.; Cao, J.; Qi, Y.; Liang, Y.; Lu, X.; Pan, Y. Research on the Learning Engagement of University Students in a Blended Learning Environment. *Front. Educ. Res.* **2023**, *6*, 64–71. [CrossRef]
30. Goodfellow, M.; Liaskos, K. Tips for Effective Blended Learning for Computer Science Education. In Proceedings of the 2023 Conference on Innovation and Technology in Computer Science Education V. 2, Turku, Finland, 7–12 July 2023; ACM: New York, NY, USA, 2023; pp. 589–590.
31. Wrobel-Tobiszewska, A.; Lyden, S.; Holloway, D.; Henderson, A.; Doe, P.; Millar, B. Engagement in the Blended Learning Model of a Post-COVID University. In *Advancing Engineering Education Beyond COVID*; Gratchev, I., Espinosa, H.G., Eds.; CRC Press: Boca Raton, FL, USA, 2022; pp. 31–50.
32. Sibanda, T.; Josua, L. COVID-19 Triggered Technology Integration Strategies for Enhanced Student Engagement in Blended Learning. *Afr. J. Educ. Pract.* **2022**, *8*, 1–18. [CrossRef]
33. Aristeidou, M.; Cross, S. Disrupted Distance Learning: The Impact of Covid-19 on Study Habits of Distance Learning University Students. *Open Learn. J. Open Distance E-Learn.* **2021**, *36*, 263–282. [CrossRef]
34. Cope, C.; Staehr, L. Improving Students' Learning Approaches through Intervention in an Information Systems Learning Environment. *Stud. High. Educ.* **2005**, *30*, 181–197. [CrossRef]
35. Kember, D.; Leung, D.Y.P. Influences upon Students' Perceptions of Workload. *Educ. Psychol.* **1998**, *18*, 293–307. [CrossRef]
36. Kyndt, E.; Berghmans, I.; Dochy, F.; Bulckens, L. 'Time Is Not Enough.' Workload in Higher Education: A Student Perspective. *High. Educ. Res. Dev.* **2014**, *33*, 684–698. [CrossRef]
37. Ibrahim, S.; Ismail, F. University ESL Instructors' Reflections on the Use of Blended Learning in Their Classrooms. *TESOL Technol. Stud.* **2021**, *2*, 25–35. [CrossRef]
38. El Sadik, A.; Al Abdulmonem, W. Improvement in Student Performance and Perceptions through a Flipped Anatomy Classroom: Shifting from Passive Traditional to Active Blended Learning. *Anat. Sci. Educ.* **2021**, *14*, 482–490. [CrossRef]
39. Cole, J.E.; Kritzer, J.B. Strategies for Success: Teaching an Online Course. *Rural Spec. Educ. Q.* **2009**, *28*, 36–40. [CrossRef]
40. Budhai, S.S.; Skipwith, K. *Best Practices in Engaging Online Learners Through Active and Experiential Learning Strategies*, 2nd ed.; Routledge: New York, NY, USA, 2021.
41. Hassan Ja'ashan, M.M.N. Perceptions and Attitudes towards Blended Learning for English Courses: A Case Study of Students at University of Bisha. *Engl. Lang. Teach.* **2015**, *8*, 40. [CrossRef]
42. Hart, S.G. NASA-Task Load Index (NASA-TLX); 20 Years Later. *Hum. Fac. Erg. Soc. P.* **2006**, *50*, 904–908. [CrossRef]
43. Deci, E.L.; Ryan, R.M. Self-Determination Theory. In *International Encyclopedia of the Social & Behavioral Sciences*, 2nd ed.; Wright, J.D., Ed.; Elsevier: Oxford, UK, 2015; pp. 486–491.
44. McAuley, E.; Duncan, T.; Tammen, V.V. Psychometric Properties of the Intrinsic Motivation Inventory in a Competitive Sport Setting: A Confirmatory Factor Analysis. *Res. Q. Exerc. Sport* **1989**, *60*, 48–58. [CrossRef] [PubMed]
45. Markland, D.; Hardy, L. On the Factorial and Construct Validity of the Intrinsic Motivation Inventory: Conceptual and Operational Concerns. *Res. Q. Exerc. Sport* **1997**, *68*, 20–32. [CrossRef] [PubMed]
46. Weissinger, E.; Bandalos, D.L. Development, Reliability and Validity of a Scale to Measure Intrinsic Motivation in Leisure. *J. Leis. Res.* **1995**, *27*, 379–400. [CrossRef]
47. Bayrak, F.; Tibi, M.H.; Altun, A. Development of Online Course Satisfaction Scale. *Turk. Online J. Distance Educ.* **2020**, *21*, 110–123. [CrossRef]
48. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed.; L. Erlbaum Associates: Hillsdale, NJ, USA, 1988.
49. Radulović, B.; Dorocki, M.; Olić Ninković, S.; Stojanović, M.; Adamov, J. The Effects of Blended Learning Approach on Student Motivation for Learning Physics. *J. Balt. Sci. Educ.* **2023**, *22*, 73–82. [CrossRef]
50. Schechter, R.L.; Kazakoff, E.R.; Bundschuh, K.; Prescott, J.E.; Macaruso, P. Exploring the Impact of Engaged Teachers on Implementation Fidelity and Reading Skill Gains in a Blended Learning Reading Program. *Read. Psychol.* **2017**, *38*, 553–579. [CrossRef]
51. Capdeferro, N.; Romero, M. Are Online Learners Frustrated with Collaborative Learning Experiences? *Int. Rev. Res. Open Distrib. Learn.* **2012**, *13*, 26–44. [CrossRef]

52. Panagiotidis, P.; Krystalli, P.; Arvanitis, P. Technology as a Motivational Factor in Foreign Language Learning. *Eur. J. Educ.* **2023**, *6*, 69–84. [CrossRef]
53. Muthmainnah; Yakin, A.A.; Seraj, P.M.I. Impact of Metaverse Technology on Student Engagement and Academic Performance: The Mediating Role of Learning Motivation. *Int. J. Comput. Inf. Manuf. IJCIM* **2023**, *3*, 10–18. [CrossRef]
54. Moca, M.; Badulescu, A. Determinants of Economical High School Students' Attitudes toward Mobile Devices Use. *Sustainability* **2023**, *15*, 9331. [CrossRef]
55. Nicol, D.J.; Macfarlane-Dick, D. Formative Assessment and Self-regulated Learning: A Model and Seven Principles of Good Feedback Practice. *Stud. High. Educ.* **2006**, *31*, 199–218. [CrossRef]
56. Dowden, T.; Pittaway, S.; Yost, H.; McCarthy, R. Students' Perceptions of Written Feedback in Teacher Education: Ideally Feedback Is a Continuing Two-Way Communication That Encourages Progress. *Assess. Eval. High. Educ.* **2013**, *38*, 349–362. [CrossRef]
57. Hrastinski, S. Asynchronous and Synchronous E-Learning. *Educ. Q.* **2008**, *31*, 51–55.
58. Varkey, T.C.; Varkey, J.A.; Ding, J.B.; Varkey, P.K.; Zeitler, C.; Nguyen, A.M.; Merhavy, Z.I.; Thomas, C.R. Asynchronous Learning: A General Review of Best Practices for the 21st Century. *J. Res. Innov. Teach. Learn.* **2022**, *16*, 4–16. [CrossRef]
59. Martin, F.; Parker, M.A.; Deale, D.F. Examining Interactivity in Synchronous Virtual Classrooms. *Int. Rev. Res. Open Distrib. Learn.* **2012**, *13*, 228–261. [CrossRef]
60. Novotny, B.A.; Ko, K.; Garris, B.R. Lights, Camera, Action: A Focus Group Study Exploring University Students' Experiences of Learning Via Zoom. *J. Educ. Online* **2022**, *19*, 1–13. [CrossRef]
61. Mehrpouyan, A. Enhancing Online English Language and Literature Classrooms: Effective and Practical Teaching Strategies. *Educ. Inf. Technol.* **2023**, *28*, 4127–4141. [CrossRef]
62. Quesada-Pallarès, C.; Sánchez-Martí, A.; Ciraso-Calí, A.; Pineda-Herrero, P. Online vs. Classroom Learning: Examining Motivational and Self-Regulated Learning Strategies Among Vocational Education and Training Students. *Front. Psychol.* **2019**, *10*, 2795. [CrossRef]