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Article

Flexible Learning Environments for a Sustainable Lifelong Learning Process for Teachers in the School Context

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Abstract: The flexibility of digital learning environments allows for personalized content delivery tailored to individual teachers' needs, fostering active and engaged learning. The opportunities offered by these digital technologies can help teachers adopt a lifelong learning attitude, which has become necessary to maintaining high educational standards in line with international guidelines and policy. However, teachers often struggle to leverage these digital technologies and integrate them in their daily activities. To overcome this problem, we developed a custom-built webinar training course focused on enhancing distance learning teaching in a flexible environment. We tested this training course on a group of 197 primary school teachers and examine the relationship between learning goal orientation, motivation, and intention to transfer and how they related to teachers' personality traits. We found that our webinar training course is easily implementable and valued by teachers, who highlight the importance of allowing the choice between different training levels. The data analysis indicates that intention to transfer is predicted by learning goal orientation and motivation. In conclusion, the study emphasizes the importance of flexible learning environments and tailored training programs that meet teachers' needs and interests. From a sustainable perspective, such approaches foster teachers' lifelong learning, enhance their professional development, nurture a growth mindset, and facilitate adaptability to change.

Keywords: lifelong learning; teachers; education; school; digital technology; sustainable education



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1. Introduction

Do digital technologies contribute as resources that assist in achieving sustainability goals, or do they act as obstacles for further progress? [1,2]. Can technologies be used in schools to promote a sustainable learning environment that supports students and teachers throughout their careers? An increasing cluster of international evidence demonstrates the positive impact of digital technologies on measurable learning outcomes throughout all ages. A systematic review provided by Müller and Mildenerger [3] of 21 studies offers an overview of the impact of replacing classroom time with online learning environments, highlighting that by reducing classroom time, equivalent learning outcomes can be observed. Accordingly, the European University association proposes future university as “without walls”, emphasizing the importance of an open and engaged society centered around core learning and educational values [4]. Indeed, considering the high cost of education and the limited time teachers must invest in their own training, digital technologies can represent a sustainable and effective way to increase the availability of lifelong training to teachers everywhere. Lifelong learning opportunities must be flexible and readily available in terms of time and place [5–7] considering that the policies are intended to make them a mindset instead of an obligation [8]. Flexible learning environments provide

many benefits for both teachers and students. They promote active and engaged learning and provide teachers with differentiated instruction opportunities. Flexible learning environments also allow for more collaboration between students and teachers, which can lead to a deeper understanding of concepts. Accordingly, digital technologies can be used to create and deliver content tailored to each teacher's individual needs, starting from a selected knowledge level. This type of content delivery allows for the content's customization based on the individual needs of teachers, starting from their existing level of knowledge. Incorporating these technologies in the concept of lifelong learning has now become both a necessity and a challenge, especially in the age of AI, in which the focus should shift from human capital to human development, with a strong emphasis on capabilities [9]. Digital technologies and innovation are essential in creating learning opportunities, especially in the school-related context [10]. Nonetheless, this flexibility allows teachers to learn by using innovative approaches and strategies that they can also turn and propose to their students. Finally, digital technologies allow teachers to connect with other professionals and experts in their field, facilitating their ability to share best practices and collaborate on projects. The abilities acquired and refined through the lifelong learning process can be helpful for educational and didactical challenges such as managing uncertainty, communicating across cultures, and negotiating conflicts [11]. As a matter of fact, over the last few decades, any aspect of what we know as education has dramatically changed, and the inclusion of information and communication technologies (ICT) in its panorama as facilitators represents a resource to translate the lifelong learning pillars from theory into practice throughout the teachers' careers [12,13]. Adopting digital infrastructure for distance learning, especially in disadvantaged and resource-constrained settings, is a fundamental challenge that requires the development of human capabilities to ensure effective interactive learning experiences [14,15].

Accordingly with this perspective, an increasing number of online courses are offered to meet teachers' needs; the attendance and completion rates are often low, making motivation the critical key to focus on [16]. From a long-established perspective, lifelong learning and motivation are natural and indivisible human capacities [17]. A lifelong learner possesses a complex and diverse set of beliefs, goals, expectations, and feelings that can enhance the critical thinking process and self-awareness, fostering their motivation to learn. In this respect, to magnify this learning potential, it is vital to bring out and develop teachers' natural motivations and tendencies to learn rather than providing them with something they lack according to changing standards. Indeed, motivation to learn is enhanced and nurtured by supportive and quality relationships, learning opportunities, and responsibility for learning and meaningful tasks. This requires adaptive abilities that persons must cultivate during their growth to improve achievement-oriented behaviors [18]. Major motivation theories and studies are devoted to deepening the understanding of motivation as a predictor of choice persistence, and effort. Traditionally, the origin of motivation would be detectable in needs and reinforcements [19]. However, more recent research and theories have a greater sociocognitive emphasis, highlighting the role of beliefs, values, and goals as primary components of individuals' motivation [20]. Therefore, competence-related beliefs, such as perceived intention to transfer, play a crucial role in this field, while goal-oriented and expectancy value theories remain a significant reference point in this field [21]. Despite the consistency of the research findings, the definition and assessment of training motivation still need to be fully cleared. Several studies have tried to define the training motivation, focusing on participants' desire to learn course topics [22,23] to the level of encouragement they receive to participate and apply the acquired knowledge in their work. In addition, studies have also examined factors such as individuals' inclination to learn in a specific context and commitment to learning goals [24,25]. Learning goal orientation plays a crucial role in supporting motivation throughout a lifelong learning orientation approach. Indeed, those with a high level of learning goal orientation are inclined to those proposals that require them to learn new skills, engage in new challenges, seek out difficulties, and persevere in the face of failure. In conclusion, there is a conceptual overlap between goal

intention, learning motivation, and training motivation. If concepts like desire, interest, and involvement in the learning process serve as the foundation for how training motivation is understood, training motivation is based on a behavioral perspective that includes the quantity and durability of learning efforts and goal purposes [26].

Therefore, many elements relating to the participants' psychological features may impact their motivation throughout training, and it could be the case of personality traits. In this regard, the systematic review proposed by Kell [27] highlighted the increasing interest in studying personality traits as noncognitive variables that may predict teacher effectiveness. However, the associations between personality traits and teacher effectiveness that emerge from previous studies are highly variable.

On the other hand, it is well established that personality traits and motivation are implicated not only in the learning process, but also in training transfer [28]. Accordingly, trainees who possess high levels of conscientiousness, extraversion, and agreeableness are likely to have higher learning motivation and the desire to use their newly acquired learned content for their job practice [28]. In line with this evidence, a study by Laible and colleagues [29] highlights the relevance of personality traits on teachers' lifelong learning approach. Specifically, openness to new experiences and extraversion are positively associated with participation in all types of training with a lifelong learning perspective, while the effects of the other personality traits are highly variable, also depending on the motivation for the specific training. Moreover, an increasing number of studies, also related to the pandemic and its educational consequences, state that teachers' motivation, learning goal orientation, and intention to transfer are related to digital technologies and are crucial to achieving high educational standards [30–32], although teachers are not explicitly trained to acquire digital competencies for education in digital environments [33,34].

The present study aims to support teachers in their pursuit of lifelong learning opportunities by offering personalized custom-built online training that enhances their digital teaching skills. Our program is designed to meet the demands of modern education, providing convenient and rapid access to continuous learning opportunities that sustain motivation and self-efficacy amongst teachers. Additionally, we aim to explore the relationship between learning goal orientation (LGO), motivation (valence, instrumentality, and expectancy), and intention to transfer (ITT) regarding the training course.

2. Materials and Methods

2.1. Participants

The study involved 197 Italian teachers (F = 192, M = 5) aged between 28 and 79 ($M_{\text{age}} = 51.60$; $SD = 8.37$) from 16 Italian primary schools located in several socioeconomic areas of the Campania region (Italy). As sociodemographic measures, we collected their job experience ($M_{\text{years}} = 22.9$; $SD = 9.67$) and their educational level: 104 teachers (53%) had a high school diploma; 68 (35%) had a master's degree; 22 (11%) a bachelor's degree; and only 3 people (1%) reported obtaining a PhD. Teachers were recruited for participation in the study by convenience sampling. Participation in this research was voluntary and data were collected anonymously. The study was approved by the Ethical Committee of the University of Zurich (protocol number OEC IRB # 2020-002) and executed in accordance with the Declaration of Helsinki.

2.2. The Training Program

We proposed a custom-built webinar training course entitled "Orient yourself in the Digital Clouds" aimed to improve and enhance the teaching action of distance learning (DL). The training program was developed as part of the project "CaleidoScuola -STEM-UP! Cooperation and Cognitive Abilities in Primary Schools". Specifically, the training program "Orient yourself in the Digital Clouds" includes a series of webinars divided into two training paths composed of six learning units each; webinars were accessible for free over a three-month period (Figure 1). The two paths are intended to meet the different participants' levels of digital competencies; the first focuses on basic digital skills related

to sharing and communicating with students, while the advanced one aims to build the capabilities needed to create digital artifacts. Teachers could decide which training to attend basic, advanced, or both (basic = 66 teachers; advanced = 92 teachers; both = 39 teachers). The two paths included six learning units similar in their topics but developed at a different level, i.e., basic and advanced. In the basic path, (a) the first module, entitled “Google Suite for Education”, included three webinars respectively aimed at explaining with detail the three basic tools of the Google package, which are “Drive”, “Classroom” and “Google Modules”; (b) the second module, entitled “Building and Sharing Content”, included four webinars, two of which were aimed at explaining in detail the functions of “Power Point”, and the third and fourth were aimed at explaining “Gpre” and “Padlet” programs; (c) the third module, entitled “Storytelling and Digital Books”, included three specific webinars on “Phraseit”, “Pablo”, and “Ourboox” platforms for creating books in digital and multimedia format; (d) the fourth module, entitled “Participation and Proposals”, included three webinars on the basic platforms “WordArt”, “Answergarden”, and “Jamboard” for real-time sharing and editing of multimedia educational content; (e), the fifth module, entitled “Gaming”, included two videos: “Learning Apps” and “Wordwall”, for basic creation of interactive activities through the gaming mode; (f) the sixth module, entitled “Content Mapping and Sharing”, included two videos: “Coggle” and “QRcode”, aimed at providing basic information on possible methods of organizing and communicating educational content. Instead, the advanced path included six modules related to the same topics covered at a more advanced level: (a) the first module, entitled “Creating Artifacts”, included four videos, respectively, on the platforms “Piktochart”, “Phraseit”, “Pablo”, and “Canva”, in order to provide advanced knowledge about existing graphic design tools that can be applied for educational purposes; (b) the second module, entitled “Avatars and Multimedia Pathways”, included four videos, two of which were entitled “Avatar” and “WordArt” and the other two on “Thinglink”, aimed at providing more advanced information on useful platforms for designing educational and didactic-organizational actions to improve school learning outcomes; (c) the third module, entitled “Gaming”, included four videos: “Kahoot”, “Flippity”, “LearningApps”, and “Wordwall” to provide informational content on more complex educational platforms based on gaming; (d) the fourth module, entitled “Participation and Proposals”, included five videos: “Modules”, “Tricider”, “Answergarden”, “Mentimeter”, and “PearDeck” for faster sharing of teaching content; (e) the fifth module, entitled “Storytelling video and audio”, included four videos: “Bookcreator”, “Adobe” “Spreaker”, and “Power Point”, for advanced creation of interactive activities using the game mode; (f) the sixth module, titled “Content Mapping and Sharing”, included two videos: “Coggle” and “QRcode”, aimed at providing additional information on possible methods of educational content management.

2.3. Procedures

Participants were asked to complete an online questionnaire at the beginning and the end of the training course (basic and/or advanced). First, a small number of sociodemographic data were collected to gain information regarding age, years of teaching experience, level of education, and experience in teaching specifically for students with special educational needs (BES) or disabilities. Then, a series of questionnaires developed based on the measure subscales used in previous studies and coherently with the investigated dimensions, namely learning goal orientation, motivation, and intention to transfer the learned contents [26,35,36] and consisted of 2 versions: pretraining questionnaire and post-training questionnaire. For each statement, teachers were asked to assess the level of agreement, using a 5-point Likert scale (from 1 = “Strongly Disagree”, to 5 = “Strongly Agree”).

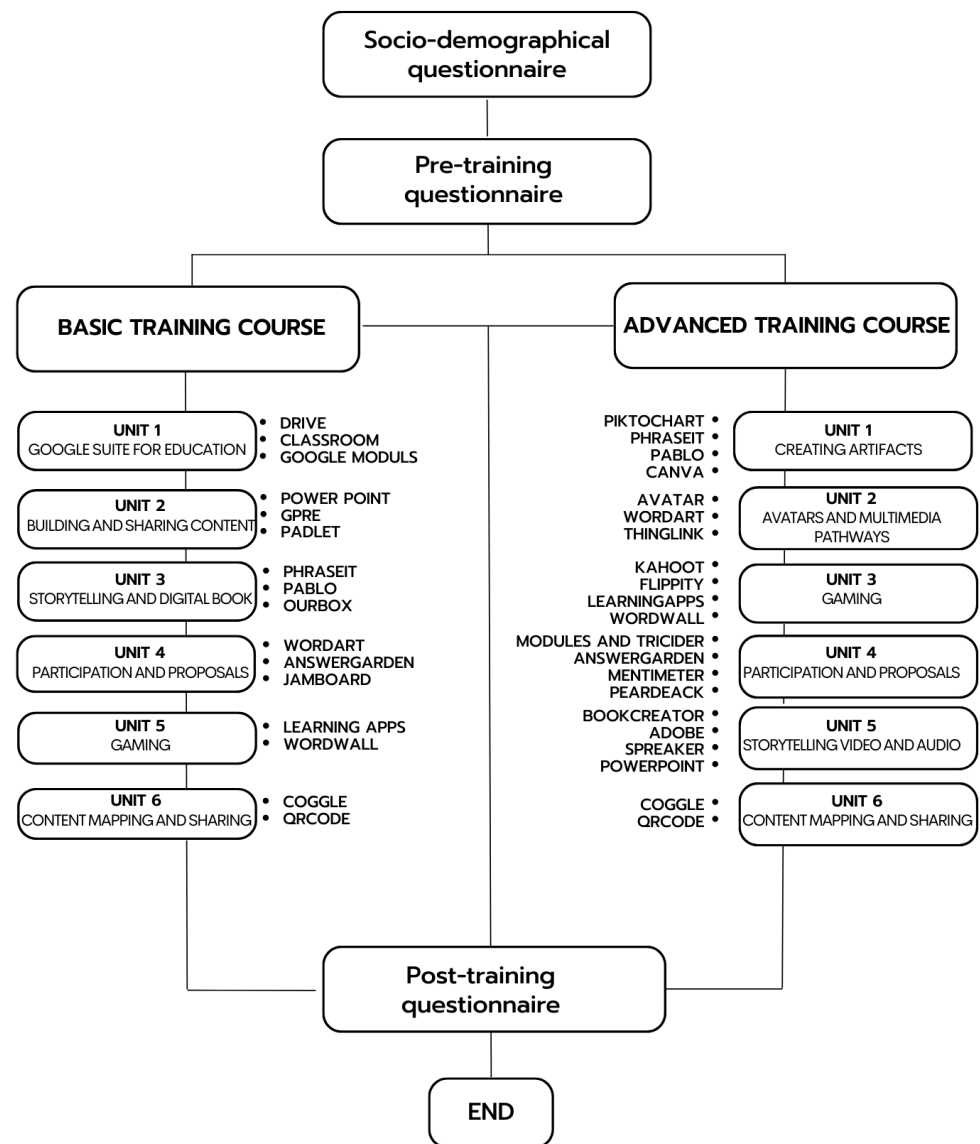


Figure 1. Flowchart of data collection procedure and details about training courses.

2.4. Measures

Pretraining measures:

Training motivation measure (TM)

The training valence (TM_v), instrumentality (TM_i), and expectancy (TM_e) scale—T-VIES [26]—was used, which consists of 9 items divided into 3 subscales: (a) 3 for valence (e.g., ‘Attending training activities, I want to improve technical/practical knowledge in my job’); (b) 3 for instrumentality (e.g., ‘I believe the training activity is useful for workers who occupy a job position similar to mine’); (c) 3 for expectancy (e.g., ‘If I am involved in training activities, I am confident I can master aspects of my job.’). In this study, the reliability for valency subscale was Cronbach’s $\alpha = 0.95$; for the instrumentality subscale, it was Cronbach’s $\alpha = 0.92$; for the expectancy subscale, it was Cronbach’s $\alpha = 0.96$. These reliabilities can be considered acceptable [37].

Learning Goal Orientation (LGO)

We used the learning goal orientation scale [36], which consists of 8 items (e.g., ‘The opportunity to do challenging work is important to me’; ‘When I fail to complete a difficult task, I plan to try harder the next time I work on it’; ‘I prefer to work on tasks that force me

to learn new things'). In this study, the reliability for this scale was Cronbach's $\alpha = 0.96$. This reliability can be considered acceptable [37].

Post-training measure:

Intention to transfer (ITT)

We used the intention to transfer subscale [35], which consists of 3 items (e.g., 'Using in my daily job-related activities what did I learn from training'; 'Becoming more competent having the opportunity to attend training courses'; 'being able to use in my job activities the knowledge acquired in this course'). In this study, the reliability for this scale was Cronbach's $\alpha = 0.92$. This reliability can be considered acceptable [37].

3. Results

Analyses were carried out using Jamovi software [38,39]. Descriptive statistics are shown in Table 1.

Table 1. Participants' characteristics and sociodemographic variables.

	Mean (SD)
Age (years)	51.6 (8.37)
Education (years)	15.18 (2.42)
Job experience (years)	22.9 (9.67)

Data were tested for normality using the Shapiro–Wilk test: $Z_{LGOs} = 0.798$, <0.001 ; $Z_{TMe} = 0.823$, <0.001 ; $Z_{TMi} = 0.839$, <0.001 ; $Z_{TMv} = 0.782$, <0.001 ; $Z_{ITT_Advanced_Training} = 0.775$, <0.001 ; $Z_{ITT_Beginner_Training} = 0.775$, <0.001 ; all variables were unlikely to be normally distributed, and for this reason, correlation analyses were performed using Spearman's Rho.

Since the theoretical model proposed by Zaniboni and colleagues [26], concerning the association between the learning goal orientation and the intention to transfer was mediated by the construct of motivation in its three declinations, i.e., valence, instrumentality, and expectancy, a structural equation model was tested. Considering the presence of two different training courses, we ran two sequential mediation models. A total of 1000 bootstrap samples were used as a nonparametric method, which bypasses the issue of non-normality distribution, allowing one to test the indirect effect [40], even in small samples [41].

Concerning the beginner training model (Figure 2), the considered pathways had the expected sign, but most of the coefficients were not precisely estimated, and their p -values fell below the usual standards of statistical significance. Although the LGO was positively and significantly correlated with the three dimensions of motivation, the direct effect of LGO on the ITT was positive but small ($b = 0.167$) and noisily estimated (p -value = 0.361). Similarly, although the correlation between LGO and TM was statistically significant (TMv: $b = 0.780$, $p < 0.001$; TMi: $b = 0.738$, $p < 0.001$; TMe: $b = 0.760$, $p < 0.001$), training motivation dimensions only showed weak and not-statistically-significant evidence of mediation of the link between LGO and ITT, especially training motivation expectancy (TMv: $b = 0.169$, $p = 0.187$; TMi: $b = 0.124$, $p = 0.312$; TMe: $b = 0.050$, $p = 0.652$). The data suggest that the link between training motivation and ITT was the weakest.

On the other hand, estimates from the advanced training model (Figure 3) showed stronger and statistically significant relations. The data show a sizeable and significant direct effect of LGO on ITT ($b = 646$, $p < 0.001$) and even stronger correlations between LGO and TM dimensions (TMv: $b = 0.784$, $p < 0.001$; TMi: $b = 0.783$, $p < 0.001$; TMe: $b = 0.757$, $p < 0.001$). Interestingly, TMe negatively mediates the relation between LGO and ITT ($b = -0.319$, $p < 0.05$), probably given its negative correlation with ITT ($b = -0.421$, $p < 0.05$).

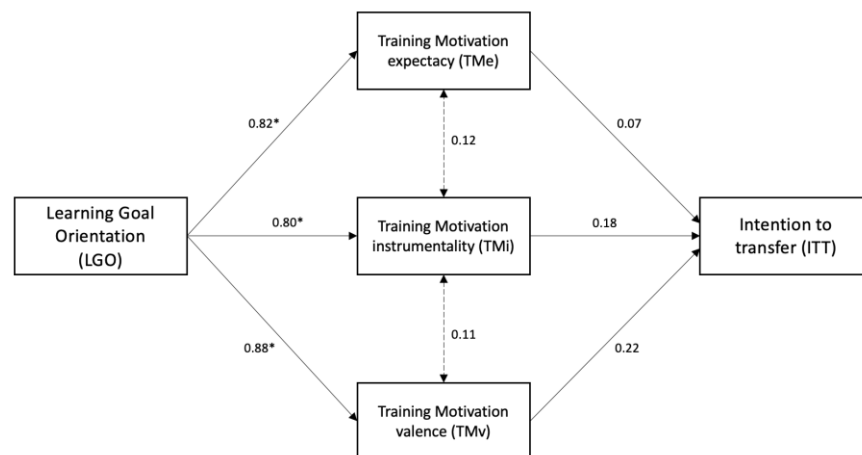


Figure 2. Sequential mediation model for the beginner training group using the learning goal orientation (LGO) as the focal predictor, three dimensions of training motivation as mediators, and intention to transfer (ITT) as an outcome. Note. * = $p < 0.05$.

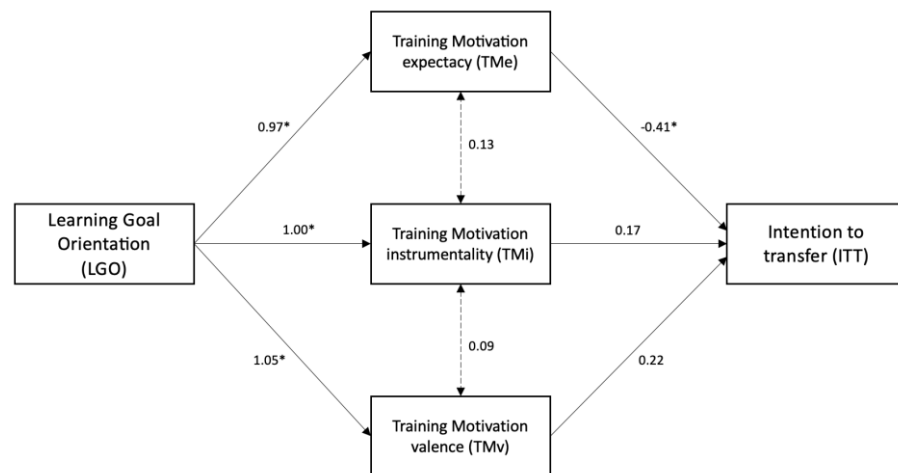


Figure 3. Sequential mediation model for the advanced training group using the learning goal orientation (LGO) as the focal predictor, three dimensions of training motivation as mediators, and intention to transfer (ITT) as an outcome. Note. * = $p < 0.05$.

To deepen the understanding of the negative mediating role of TMe on the relationship between LGO and ITT in the advanced training group, we explored the association between TMe and some contextual variables, i.e., school environment, the availability of resources, and the perception of institutional support. Spearman's correlation analysis showed a significant correlation between the contextual variables and TMe ($\rho = 0.494, p < 0.001$).

The three dimensions of motivation also showed a strong positive correlation with some facets of the BIG5 personality traits, notably agreeableness, conscientiousness, openness, and, to a lesser extent, emotional stability. Spearman's correlation analyses (Table 2) showed sizeable links between BIG5_agreeableness and all the TM dimensions (TMv: $r = 0.317, p < 0.001$; TMi: $r = 0.294, p < 0.001$; TMe: $r = 0.348, p < 0.001$) and a similarly high magnitude of positive correlations with BIG5_conscientiousness (TMv: $r = 0.316, p < 0.001$; TMi: $r = 0.271, p < 0.001$; TMe: $r = 0.298, p < 0.001$). Also, BIG5_openness (TMv: $r = 0.232, p = 0.001$; TMi: $r = 0.271, p < 0.001$; TMe: $r = 0.268, p < 0.001$) and BIG5_EmotionalStability (TMv: $r = 0.160, p < 0.05$; TMi: $r = 0.236, p < 0.05$; TMe: $r = 0.221, p < 0.05$) are positively and significantly correlated with TM dimensions, although this latter is the weakest. Motivation and BIG5_extroversion, on the other hand, display levels of correlation very close to zero and are never statistically significant.

Table 2. Significant results correlation analysis between BIG5 personality traits' averaged data and dimensions of training motivations ($p < 0.05$). Results are provided using Spearman's correlation coefficient ρ_S (p value). Bold highlights the significant comparisons.

		TM Valence	TM Instrumentality	TM Expectancy
BIG5_Extroversion	Spearman's rho	0.009	−0.005	0.072
	p -value	0.900	0.947	0.324
Big5_Agreeableness	Spearman's rho	0.317	0.294	0.348
	p -value	<0.001	<0.001	<0.001
BIG5_Conscientiousness	Spearman's rho	0.316	0.271	0.298
	p -value	<0.001	<0.001	<0.001
BIG5_Emotional Stability	Spearman's rho	0.160	0.236	0.221
	p -value	0.030	0.001	0.003
BIG5_Openness	Spearman's rho	0.232	0.271	0.268
	p -value	0.001	<0.001	<0.001

4. Discussion

The present study investigates the relationship between learning goal orientation (LGO), motivation (valence, instrumentality, and expectancy), and intention to transfer (ITT) related to a custom-built webinar training course focused on enhancing the teaching action of distance learning in a flexible learning environment.

Overall, we find a strong positive relationship between learning goal orientation and motivation, but only a weak positive association between motivation and intention to transfer. These patterns are more evident in the sample of teachers who completed the advanced training course, and slightly more muted in the beginners' training. For example, although there were significant correlations between LGO and motivation dimensions in the beginner training model, the estimated direct effect of LGO on ITT was positive but not significant in this setting. Furthermore, the training motivation dimensions did not significantly mediate the link between LGO and ITT. In contrast, in the advanced training model, there was a significant direct effect of LGO on ITT, and the motivation dimensions significantly mediated the relationship between LGO and ITT. Interestingly, the motivation dimension of expectancy negatively mediated the relationship between LGO and ITT and was negatively correlated with ITT. Overall, the study's results suggest that LGO and motivation are essential factors in predicting ITT in the context of training. However, the results also highlight the importance of considering the level of training when investigating the relationship between LGO, motivation, and ITT. The level of LGO strongly impacts the individual's persistence and willingness to complete a task, regardless of its difficulty. While engaging in the learning process, individuals experience various psychological states, such as confusion, surprise, anxiety, satisfaction, or helplessness, all influenced by their motivation. Our data showed that LGO is strongly associated with motivation, although this relationship does not mediate the direct association between LGO and ITT.

Motivation and learning are intensely interrelated from a psychological perspective. Motivation is the internal process that initiates, guides, and sustains goal-oriented behavior. On the other hand, also in a contemporary and sustainable perspective, learning refers to acquiring new knowledge, skills, or behaviors through experience or study [42]. Our findings suggest that motivational dimensions also play a crucial role when people learn in a digital environment. Moreover, this link is particularly significant in predicting ITT in advanced training compared to beginner training. Interestingly, expectancy and contextual variables represent a deterrent in fostering ITT, especially for people with higher competencies. Even in a digital environment, the individual's motivation determines the approach toward the task. Complex activities require additional support and strategies to enhance motivation and encourage effective learning. The negative mediating role of TMe between LGO and ITT showed that individuals with higher competencies can still find the motivation to transfer learned content from a course, even if they initially have low

expectations. Moreover, the correlation between TMe and contextual variables supports the idea that the latter are crucial in shaping participants' expectations. Contextual variables are characteristics of the situation or environment in which a phenomenon or behavior occurs. However, a training program that is easily accessible to teachers and tailored to their needs can stimulate their motivation, leading to an intention to transfer their achievements.

The link between personality traits and motivation is well understood [43]. The five broad dimensions that compose the personality from the perspective of the FFM can influence the individual's motivation by shaping interests, goals, values, and behaviors, especially when people are exposed to highly relevant learning content to improve their job performance [44]. In line with the previous study, our results show that the relationship between openness to experience and motivation became significant when participants freely decided to participate in the training program [45]. Whether training activities are conducted for occupational reasons present a weak link with openness to experience, because the employee does not decide to get into the training program [29]. Moreover, personality traits affect how individuals approach learning tasks, such as their level of persistence and the strategies they use to learn. The positive association between conscientiousness and motivation supports the idea that high-conscientiousness individuals are more likely to persist in their efforts to master complex material. In contrast, individuals with high openness to experience may be more willing to experiment with different learning strategies. Given the diverse ways teachers approach learning difficulties and their unique personality traits, it is crucial to provide flexible learning environments and readily available learning resources that can be customized to each individual teacher and setting. This strategy can lead to more effective and personalized learning experiences.

The existence and easy implementability of individually customized teaching learning technologies has implications for school administration, governmental policies, and teachers' workload. In order to ensure that students receive a high-quality education, schools must prioritize the professional development of their teachers [46]. School administrators should recognize the importance of continuing professional development and allocate teacher training and development resources. They must create a supportive culture that encourages and values lifelong learning, providing opportunities for teachers to attend workshops, conferences, and training programs. Supporting teachers' lifelong learning requires balancing their workload effectively. This balance is more easily achieved using strategies such as scheduling dedicated time for professional development, providing substitutes or support staff to cover classes, or offering flexible arrangements for teachers to engage in self-directed learning. The high rate of teachers' burnout suggest that they must be given enough time and energy to focus on their professional growth by managing their workload, and those opportunities should be preserved [47,48] Finally, students can also perceive the differences in teaching styles, content coverage, and assessment approaches [49]. Consequently, school management must ensure proper coordination and communication among teachers and between teachers and students to maintain alignment with curricula and educational standards [50].

In conclusion, effective learning environments that meet teachers' diverse needs and interests represent an opportunity to realize their lifelong learning, enhance their professional development, foster a growth mindset, and adapt to change.

5. Conclusions

Flexible learning environments are vital for creating a sustainable lifelong learning process in school contexts. Indeed, the association between LGO and motivation with respect to the training level suggests that teachers' needs must be taken into consideration when offering lifelong learning opportunities, thus ensuring that our education system remains up-to-date and ready to meet the demands of today's students. Schools can provide an environment conducive to fostering teacher growth and development by increasing access to professional development opportunities, engaging curriculum materials, and adequate support from administrators. Future studies and policy action should consider that creating

flexible learning environments is essential for nurturing a sustainable lifelong learning process for teachers and educators. Such environments give them access to the necessary resources, ensuring they stay up-to-date about the latest research and advancements in education and learning approaches. By embracing digital technology and harnessing the power of data, mainly through techniques like natural language processing and learning analytics, it is possible to develop innovative tools that leverage people's engagement levels in the learning process. With these crucial components put in place, educators will be empowered to make meaningful contributions to their classrooms while feeling supported throughout their careers and personal development.

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References

- Bohnsack, R.; Bidmon, C.M.; Pinkse, J. Sustainability in the digital age: Intended and unintended consequences of digital technologies for sustainable development. *Bus. Strategy Environ.* **2022**, *31*, 599–602. [CrossRef]
- Srivastava, K.; Dey, S. Role of Digital Technology in Teaching-Learning Process. *IOSR J. Humanit. Soc. Sci.* **2018**, *23*, 74.
- Müller, C.; Mildenerger, 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]
- European University Association. *Universities without Walls. A Vision for 2030*; European University Association: Brussels, Belgium, 2021.
- Jo, S.H. Teacher commitment: Exploring associations with relationships and emotions. *Teach. Teach. Educ.* **2014**, *43*, 120–130. [CrossRef]
- Niemi, H.; Nevgi, A. Research studies and active learning promoting professional competences in Finnish teacher education. *Teach. Teach. Educ.* **2014**, *43*, 131–142. [CrossRef]
- Vargas, C. *Lifelong Learning from a Social Justice Perspective. Education Research and Foresight Working Paper*; UNESCO: Paris, France, 2017; Volume 21.
- Nicoll, K.; Fejes, A. Lifelong Learning: A Pacification of “Know How”. *Stud. Philos. Educ.* **2011**, *30*, 403–417. [CrossRef]
- Poquet, O.; De Laat, M. Developing capabilities: Lifelong learning in the age of AI. *Br. J. Educ. Technol.* **2021**, *52*, 1695–1708. [CrossRef]
- Avvisati, F.; Hennessy, S.; Kozma, R.B.; Vincent-Lancrin, S. Review of the Italian Strategy for Digital School. 2013. Available online: <https://www.oecd-ilibrary.org/content/paper/5k487ntdbr44-en> (accessed on 16 May 2023).
- Bozat, P.; Bozat, N.; Hursen, C. The Evaluation of Competence Perceptions of Primary School Teachers for the Lifelong Learning Approach. *Procedia Soc. Behav. Sci.* **2014**, *140*, 476–482. [CrossRef]
- Hwang, G.J.; Fu, Q.K. Advancement and research trends of smart learning environments in the mobile era. *Int. J. Mob. Learn. Organ.* **2020**, *14*, 114–129. [CrossRef]
- Pépin, L. The history of EU cooperation in the field of education and training: How lifelong learning became a strategic objective. *Eur. J. Educ.* **2007**, *42*, 121–132. [CrossRef]
- Unwin, T.; Kleessen, B.; Hollow, D.; Williams, J.B.; Oloo, L.M.; Alwala, J.; Mutimucuo, I.; Eduardo, F.; Muianga, X. Digital learning management systems in Africa: Myths and realities. *Open Learn. J. Open Distance E-Learn.* **2010**, *25*, 5–23. [CrossRef]
- Kelly, K.; Zakrajsek, T.D. *Advancing Online Teaching: Creating Equity-Based Digital Learning Environments*; Taylor & Francis: Milton Park, UK, 2023.
- Hartnett, M. The Importance of Motivation in Online Learning. In *Motivation in Online Education*; Springer: Berlin/Heidelberg, Germany, 2016; pp. 5–32. [CrossRef]
- McCombs, B.L. Motivation and Lifelong Learning. *Educ. Psychol.* **1991**, *26*, 117–127. [CrossRef]

18. Brunstein, J.C.; Heckhausen, H. Achievement motivation. In *Motivation and Action*, 3rd ed.; Springer: Berlin/Heidelberg, Germany, 2018; pp. 221–304. [CrossRef]
19. Weiner, B. The development of an attribution-based theory of motivation: A history of ideas. *Educ. Psychol.* **2010**, *45*, 28–36. [CrossRef]
20. Wigfield, A.; Wentzel, K.R. Introduction to Motivation at School: Interventions That Work. *Educ. Psychol.* **2007**, *42*, 191–196. [CrossRef]
21. Wigfield, A.; Cambria, J. Students' achievement values, goal orientations, and interest: Definitions, development, and relations to achievement outcomes. *Dev. Rev.* **2010**, *30*, 1–35. [CrossRef]
22. Noe, R.A.; Schmitt, N. The influence of trainee attitudes on training effectiveness: Test of a model. *Pers. Psychol.* **1986**, *39*, 497–523. [CrossRef]
23. Rasool, H.; Bashir, F.; Nasir, Z.M. The Other Side of Goal Orientation and Training Outcomes: Mediating Role of Training Motivation. *J. Serv. Sci. Manag.* **2015**, *8*, 726–740. [CrossRef]
24. Burke, L.A.; Hutchins, H.M. Training transfer: An integrative literature review. *Hum. Resour. Dev. Rev.* **2007**, *6*, 263–296. [CrossRef]
25. Colquitt, J.A.; LePine, J.A.; Noe, R.A. Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research. *J. Appl. Psychol.* **2000**, *85*, 678–707. [CrossRef]
26. Zaniboni, S.; Fraccaroli, F.; Truxillo, D.M.; Bertolino, M.; Bauer, T.N. Training valence, instrumentality, and expectancyscale (T-VIES-it) factor structure and nomological network in an Italian sample. *J. Workplace Learn.* **2011**, *23*, 133–151. [CrossRef]
27. Kell, H.J. Do Teachers' Personality Traits Predict Their Performance? A Comprehensive Review of the Empirical Literature from 1990 to 2018. *Res. Rep.* **2019**, *2019*, 1–27. [CrossRef]
28. Ng, K.H.; Ahmad, R. Personality traits, social support, and training transfer: The mediating mechanism of motivation to improve work through learning. *Pers. Rev.* **2018**, *47*, 39–59. [CrossRef]
29. Laible, M.C.; Anger, S.; Baumann, M. Personality Traits and Further Training. *Front. Psychol.* **2020**, *11*, 2713. [CrossRef] [PubMed]
30. Anderson, S.E.; Groulx, J.G.; Maninger, R.M. Relationships among Preservice Teachers' Technology-Related Abilities, Beliefs, and Intentions to Use Technology in Their Future Classrooms. *J. Educ. Comput. Res.* **2011**, *45*, 321–338. [CrossRef]
31. Banas, J.R.; York, C.S. Authentic learning exercises as a means to influence preservice teachers' technology integration self-efficacy and intentions to integrate technology. *Australas. J. Educ. Technol.* **2014**, *30*, 728–746. [CrossRef]
32. Menabò, L.; Skrzypiec, G.; Sansavini, A.; Brighi, A.; Guarini, A. Distance Education among Italian Teachers: Differences and Experiences. *Educ. Inf. Technol.* **2022**, *27*, 9263–9292. [CrossRef]
33. Portillo, J.; Garay, U.; Tejada, E.; Bilbao, N. Self-Perception of the Digital Competence of Educators during the COVID-19 Pandemic: A Cross-Analysis of Different Educational Stages. *Sustainability* **2020**, *12*, 10128. [CrossRef]
34. Trubavina, I.; Dotsenko, S.; Naboka, O.; Chaikovskiy, M.; Meshko, H.; Skovoroda Kharkiv, H.S. Developing digital competence of teachers of Humanitarian disciplines in the conditions of COVID-19 quarantine measures. *J. Phys.* **2021**, *1840*, 12052. [CrossRef]
35. Battistelli, A.; Odoardi, C. Les composantes individuelles et organisationnelles de la motivation à la formation des adultes salariés. In *Compétences, Carrières, Evolutions au Travail*; Lancry, A., Lemoine, C., Eds.; Editions L'Harmattan: Paris, France, 2004; pp. 185–196.
36. Button, S.B.; Mathieu, J.E.; Zajac, D.M. Goal orientation in organizational research: A conceptual and empirical foundation. *Organ. Behav. Hum. Decis. Process.* **1996**, *67*, 26–48. [CrossRef]
37. Taber, K.S. The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Res. Sci. Educ.* **2018**, *48*, 1273–1296. [CrossRef]
38. The Jamovi Project. Jamovi, Version 2.3. 2022. Available online: <https://www.jamovi.org> (accessed on 16 May 2023).
39. R Core Team. *R: A Language and Environment for Statistical Computing*; Version 4.1; R Core Team: Vienna, Austria, 2021. Available online: <https://cran.r-project.org> (accessed on 16 May 2023).
40. Bollen, K.A.; Stine, R. Direct and Indirect Effects: Classical and Bootstrap Estimates of Variability. *Sociol. Methodol.* **1990**, *20*, 115. [CrossRef]
41. Preacher, K.J.; Hayes, A.F. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav. Res. Methods* **2008**, *40*, 879–891. [CrossRef] [PubMed]
42. Alam, A. Mapping a Sustainable Future through Conceptualization of Transformative Learning Framework, Education for Sustainable Development, Critical Reflection, and Responsible Citizenship: An Exploration of Pedagogies for Twenty-First Century Learning. *ECS Trans.* **2022**, *107*, 9827–9840. [CrossRef]
43. Barrick, M.R.; Mount, M.K. The big five personality dimensions and job performance: A meta-analysis. *Pers. Psychol.* **1991**, *44*, 1–26. [CrossRef]
44. Urban, K.; Jirsáková, J. Motivation and personality traits in adult learners. *J. Adult Contin. Educ.* **2021**, *28*, 151–166. [CrossRef]
45. Offerhaus, J. The Type to Train? Impacts of Personality Characteristics on Further Training Participation. *SSRN Electron. J.* **2013**. [CrossRef]
46. Karacabey, M.F. School principal support in teacher professional development. *Int. J. Educ. Leadersh. Manag.* **2021**, *9*, 54–75. [CrossRef]
47. Ferguson, K.; Frost, L.; Hall, D. Predicting teacher anxiety, depression, and job satisfaction. *J. Teach. Learn.* **2012**, *8*, 27–42. [CrossRef]

48. Learning Policy Institute. Understanding Teacher Shortages: 2018 Update. 2018. Available online: <https://learningpolicyinstitute.org/product/understanding-teacher-shortages-interactive> (accessed on 16 May 2023).
49. Shen, B.; McCaughtry, N.; Martin, J.; Garn, A.; Kulik, N.; Fahlman, M. The relationship between teacher burnout and student motivation. *Br. J. Educ. Psychol.* **2015**, *85*, 519–532. [[CrossRef](#)]
50. Olsen, A.; Huang, F. Teacher job satisfaction by principal support and teacher cooperation: Results from the schools and staffing survey. *Educ. Policy Anal. Arch.* **2019**, *27*, 11. [[CrossRef](#)]

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