

Meta-e-Learning as an Experiential Service Innovation: Learners' Perceptions of Immersive Synchronous e-Learning

El Meta-e-learning como innovación de servicios experienciales: percepciones de los estudiantes sobre el e-learning sincrónico e inmersivo

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Abstract: This study explores learners' perceptions of Meta-e-Learning (MeL) as an emerging experiential service framework for synchronous online education. MeL is conceptualised as an immersive, synchronous, and interactive three-dimensional learning environment designed to foster learner engagement, participation, and self-regulated learning. Adopting a qualitative exploratory approach, the study draws on semi-structured interviews with 31 adult learners enrolled in a synchronous online course on creative emotional intelligence. Participants reflected on their learning experiences and evaluated the potential educational value of immersive environments in comparison with conventional synchronous e-learning. Grounded in the Stimulus–Organism–Response (S-O-R) model and informed by Self-Determination Theory and Flow Theory, the findings suggest that participants perceived immersion, interactivity, and realism as key experiential stimuli that could enhance motivation, engagement, and self-regulated learning. Participants further associated these psychological responses with stronger intentions to participate in and attend synchronous sessions, as well as with higher perceived learning effectiveness. The study contributes by further developing MeL as a pedagogical and service-oriented conceptual framework that integrates immersive learning and service marketing perspectives, providing an initial theory-building foundation for future implementation-based and experimental research.

Keywords: Meta-e-learning (MeL), immersive learning environments, service experience, student engagement, self-regulated learning, synchronous online learning.

Resumen: Este estudio explora las percepciones del alumnado sobre el Meta-e-Learning (MeL) como un marco experiencial emergente para la enseñanza síncrona en línea. El MeL se conceptualiza como un entorno de aprendizaje tridimensional, inmersivo, síncrono e interactivo, diseñado para fomentar el compromiso del estudiante, la participación y el aprendizaje autorregulado. Mediante un enfoque cualitativo de carácter exploratorio, el estudio se basa en entrevistas semiestructuradas realizadas a 31 estudiantes adultos matriculados en un curso síncrono en línea sobre inteligencia emocional creativa. Los participantes reflexionaron sobre sus experiencias de aprendizaje y evaluaron el potencial valor educativo de los entornos inmersivos en comparación con el e-learning síncrono convencional. Basándose en el modelo Estímulo–Organismo–Respuesta (S-O-R) y apoyándose en la Teoría de la Autodeterminación y la Teoría del Flujo, los resultados sugieren que los participantes percibieron la inmersión, la interactividad y el realismo como estímulos experienciales clave con capacidad para potenciar la motivación, el compromiso y el aprendizaje autorregulado. Asimismo, los participantes asociaron estas respuestas psicológicas con una mayor intención de participar y asistir a las sesiones síncronas, así como con una mayor percepción de la eficacia del aprendizaje. El estudio contribuye al desarrollo del MeL como un marco conceptual de carácter pedagógico y orientado al servicio que integra las perspectivas del aprendizaje inmersivo y del marketing de servicios, proporcionando una base inicial para la construcción teórica que sirva de apoyo a futuras investigaciones experimentales y estudios basados en su implementación.

Palabras clave: Meta-aprendizaje electrónico (MeL), entornos de aprendizaje inmersivos, experiencia de servicio, compromiso del alumnado, aprendizaje autorregulado, aprendizaje en línea síncrono.

1. INTRODUCTION

The expansion of digital learning has fundamentally reshaped the delivery of education, particularly through synchronous e-learning formats that enable real-time interaction between instructors and students. Despite these advances, persistent challenges remain, including low engagement, limited participation, and reduced emotional connection compared to face-to-face learning environments.

From a service perspective, education is increasingly understood as a co-created experience in which value emerges through interactions between learners and the learning environment. However, in online contexts, this experiential dimension is often weakened due to the lack of physical presence and reduced sensory richness.

This limitation is closely related to social presence, understood as the extent to which individuals perceive others as psychologically present in mediated communication environments (Short et al., 1976). In online education, reduced social presence may weaken interaction quality, emotional connection, and learner engagement, thereby reinforcing the relevance of immersive environments that simulate more natural forms of social interaction.

To address these limitations, previous research has explored the use of gamification and interactive tools to enhance motivation and engagement. Gamification has been widely conceptualised as the use of game-design elements in non-game contexts (Deterting et al., 2011), and prior research suggests that it can positively influence motivation, engagement, and participation in educational and digital service settings (Hamari et al., 2014). However, gamification often operates as an additional layer within existing platforms rather than transforming the spatial, social, and experiential structure of the learning environment. Thus, while gamified elements may improve engagement, they do not necessarily overcome the experiential limitations of conventional two-dimensional e-learning interfaces.

This issue is particularly relevant in Accounting, Finance and Business Administration education, where synchronous online teaching is increasingly used to develop not only technical knowledge but also transversal competences such as decision-making, communication, teamwork, leadership, negotiation, emotional intelligence, and self-regulated learning. These competences are central to business education because they require active participation, interaction, and experiential engagement rather than passive content reception. Therefore, exploring learners' perceptions of immersive synchronous environments may offer useful insights for the design of immersive teaching strategies and synchronous learning services in Accounting, Finance and Business Administration programmes.

In parallel, immersive technologies—such as virtual reality and three-dimensional environments—have been shown to enhance presence, engagement, and experiential learning by simulating real-world interaction. These environments allow learners to “inhabit” digital spaces, interact with objects and peers, and engage in embodied learning processes, in which cognition is shaped by bodily action, situated interaction, and sensorimotor experience (Johnson-Glenberg, 2018). Research indicates that such immersive environments increase perceived presence, enjoyment, and engagement, although their direct impact on learning outcomes may vary.

Despite these advances, there remains a lack of conceptual integration between immersive technologies and pedagogical models in online education. Existing research has primarily focused on technological affordances rather than on the design of holistic learning experiences.

This study addresses this gap by introducing Meta-e-Learning (MeL) (del Castillo, 2022) as an experiential and service-oriented framework. MeL is defined as a synchronous, immersive, and interactive online learning process that takes place within a three-dimensional environment closely resembling real-world contexts. Unlike traditional e-learning, MeL emphasises active participation, experiential engagement, and learner autonomy, positioning the student as a central actor in the learning process.

The objective of this study is to explore learners' perceptions, expectations, and behavioural intentions regarding the potential adoption of MeL as an experiential learning environment, compared with conventional synchronous e-learning. Rather than evaluating an implemented MeL environment, this study examines how learners conceptualise its potential value and anticipated influence on motivation, engagement, participation, self-regulated learning, and perceived learning effectiveness.

2. THEORETICAL FRAMEWORK AND RESEARCH QUESTIONS

2.1. *Meta-e-Learning (MeL) as an experiential service innovation*

From a service marketing perspective, experiences are understood as subjective responses arising from users' interactions with service environments (Lemon & Verhoef, 2016). In digital contexts, these experiences are shaped by interface design, levels of interactivity, and the extent to which the environment fosters emotional involvement (Rose et al., 2012). Within the Service-Dominant Logic, value is not delivered but co-created through the active participation of users (Vargo & Lusch, 2008).

In online education, this implies that learning outcomes depend not only on content delivery but also on how learners interact with the learning environment. However, traditional e-learning environments present significant limitations in terms of experiential richness, largely due to their two-dimensional nature and reduced sense of social

presence (Garrison et al., 2000). This is particularly relevant within the community of inquiry perspective, where social presence is considered central to meaningful online learning experiences.

Three-dimensional immersive environments introduce an additional experiential layer by enabling users to "inhabit" digital spaces and interact more naturally with peers and learning objects (Slater & Wilbur, 1997). In this context, MeL is conceptualised as an experiential service innovation that integrates immersion, interactivity, realism, and active participation within a unified learning system. Rather than defining a specific virtual platform or technological infrastructure, MeL proposes a pedagogical and service-oriented framework through which immersive technologies can be organised to foster learner engagement, value co-creation, and self-regulated learning.

Although MeL was originally proposed as a conceptual framework (del Castillo, 2022), subsequent studies have already incorporated this construct into broader discussions on immersive learning, metaverse-based education, and digital innovation (Prados et al., 2024; Villar Castillo et al., 2024). Furthermore, recent research has extended its application beyond educational contexts, recognising its relevance within wider debates on immersive technologies and digital consumer experiences (Kaman & Deshmukh, 2025). This emerging body of literature suggests that MeL is progressively being recognised as a distinct conceptual contribution within the broader ecosystem of immersive digital environments.

Although MeL shares several technological characteristics with immersive virtual learning environments (IVLEs), educational metaverse platforms, and three-dimensional virtual worlds, its contribution lies in its conceptual rather than technological orientation. Whereas previous approaches have primarily emphasised the capabilities of immersive technologies, MeL integrates these technological affordances within a coherent framework grounded in service marketing, educational psychology, and experiential learning. Consequently, MeL should be understood as a broader conceptual model for designing immersive synchronous learning experiences rather than as an alternative label for existing metaverse technologies. This conceptual perspective is consistent with the growing scholarly interest in immersive learning and metaverse-based education, where MeL has begun to be recognised as a specific conceptual contribution within the broader discussion on digital educational innovation (del Castillo, 2022; Villar Castillo et al., 2024; Kaman & Deshmukh, 2025).

Table 1. Conceptual positioning of Meta-e-Learning (MeL)

Construct	Primary focus	Main contribution	Difference from MeL
Immersive Virtual Learning Environments (IVLEs)	Immersive technology	Presence and interaction	Technology-oriented rather than service-oriented
Educational metaverse	Persistent virtual ecosystems	Shared virtual environments	Focus on platform rather than learner experience
Three-dimensional virtual worlds	Spatial interaction	Simulation	Does not explicitly integrate service experience or value co-creation
Meta-e-Learning (MeL)	Experiential service framework	Integrates immersion, interactivity, realism, engagement and value co-creation	Pedagogical and service-oriented conceptual framework

As shown in Table 1, MeL should not be understood as a competing technological platform, but as a conceptual framework that integrates the pedagogical, psychological, and service dimensions of immersive synchronous learning. In this sense, MeL complements rather than replaces existing technological approaches by providing an overarching experiential perspective through which immersive learning environments may be conceptualised and designed.

RQ1. *How do learners perceive MeL as an experiential service compared to traditional e-learning environments?*

2.2. Theoretical foundations of Meta-e-Learning (MeL)

The conceptualisation of MeL in this study is grounded in six complementary theoretical perspectives that together provide a robust framework for understanding learner behaviour in immersive digital environments: the Stimulus–Organism–Response (S–O–R) model, self-determination theory, flow theory, social presence theory, service-dominant logic, and self-regulated learning theory.

First, the S–O–R model (Mehrabian & Russell, 1974) provides a foundational framework for analysing how environmental factors influence individual behaviour. According to this model, external stimuli (S) affect internal psychological states (O), which in turn shape behavioural responses (R). In the context of this study, immersive learning environments characterised by immersion, interactivity, and realism can be conceptualised as stimuli that influence learners' internal states, such as motivation, engagement, and self-regulation. Within the conceptual framework proposed in this study, these internal states are expected to influence behavioural intentions, including participation, attendance, and perceived learning effectiveness. The S–O–R framework is particularly relevant in digital and service environments, where user experiences are shaped by technologically mediated interactions.

Second, self-determination theory (Deci & Ryan, 2000) provides a psychological explanation for how and why immersive environments may enhance motivation. This theory posits that intrinsic motivation is fostered when three basic psychological needs are satisfied: autonomy, competence, and relatedness. MeL environments, by enabling learners to actively navigate and interact within a three-dimensional space, may enhance autonomy (through freedom of action), competence (through feedback and skill development), and relatedness (through social interaction). As such, MeL environments are expected to foster higher levels of intrinsic motivation compared to traditional e-learning formats.

Third, flow theory (Csikszentmihalyi, 1990) explains how immersive experiences can lead to deep engagement and optimal learning conditions. Flow is defined as a state of complete absorption in an activity, characterised by high levels of concentration, enjoyment, and intrinsic reward. This state is more likely to occur when individuals perceive a balance between challenge and skill, as well as a sense of control and immediate feedback. Immersive and interactive learning environments, such as those proposed in MeL, are particularly conducive to facilitating flow experiences, as they combine realism, interactivity, and active participation.

Fourth, social presence theory further supports the conceptualisation of MeL by explaining why immersive environments may strengthen interaction quality and emotional connection in online education. Social presence refers to the degree to which individuals perceive others as psychologically present in mediated communication environments (Short et al., 1976). In MeL environments, three-dimensional interaction,

avatars, and synchronous participation may increase the perceived immediacy and relational quality of online learning, thereby addressing one of the main limitations of conventional e-learning environments.

Fifth, the conceptualisation of MeL is further supported by the principles of service-dominant logic (Vargo & Lusch, 2008), which posit that value is co-created through interactions between providers and users rather than delivered unilaterally. Within this perspective, learners are not passive recipients of educational content but active participants in shaping their own learning experience. MeL environments, characterised by immersion and interactivity, facilitate this co-creation process by enabling learners to engage dynamically with both the content and other participants. As such, MeL can be understood as a service system in which value emerges through experiential engagement and participation.

Sixth, the concept of self-regulated learning provides an important theoretical foundation for understanding how learners interact with immersive environments. Self-regulated learning refers to the process by which individuals actively control, monitor, and evaluate their own learning (Zimmerman, 2002). In digital learning contexts, the ability to self-regulate is particularly critical, as learners must manage their attention, motivation, and learning strategies independently. MeL environments may enhance self-regulated learning by offering greater autonomy, interactive feedback, and opportunities for experiential engagement. These features allow learners to take a more active role in their learning process, thereby improving both perceived and actual learning outcomes.

Taken together, these theoretical perspectives provide a comprehensive framework for understanding how MeL environments influence learner behaviour. Specifically, immersive features act as stimuli (S), shaping psychological states such as motivation, engagement, and self-regulation (O), which in turn influence behavioural outcomes (R), including participation and perceived effectiveness. This integrated approach allows for a more holistic understanding of MeL as both a psychological and experiential phenomenon.

2.3. Immersion and perceived motivation

Immersion has been defined as the extent to which a mediated environment generates a sense of presence, that is, the feeling of “being inside” the virtual environment (Slater & Wilbur, 1997). In educational settings, immersive environments have been shown to increase learners' interest, enjoyment, and emotional involvement (Makransky & Lilleholt, 2018; Petersen et al., 2022).

From the perspective of self-determination theory, intrinsic motivation is enhanced when individuals perceive activities as engaging and meaningful (Deci & Ryan, 2000). Immersive environments may facilitate such motivation by increasing both cognitive and emotional involvement in the learning process.

In service contexts, greater experiential involvement has been associated with higher perceived value (Lemon & Verhoef, 2016), reinforcing the relevance of immersion as a key driver of motivation.

RQ2. *How do learners expect immersion in MeL environments to influence their motivation compared with conventional synchronous e-learning?*

2.4. Interactivity and engagement

Interactivity refers to the degree to which users can influence the content and dynamics of a digital environment (Steuer, 1992). In online education, interactivity has been identified as a critical factor in fostering engagement, as it promotes active participation and reduces passive learning (Hrastinski, 2008; Martin & Bolliger, 2018).

Immersive environments enhance interactivity by enabling real-time communication, direct manipulation of objects, and collaborative participation. This aligns with the concept of value co-creation in service research, where users actively shape their own experience (Vargo & Lusch, 2008).

From an engagement perspective, such dynamics encourage deeper cognitive and emotional involvement in the learning process.

RQ3. *How do learners perceive the potential contribution of interactivity in MeL environments to learner engagement?*

2.5. Realism and self-regulated learning

Realism in virtual environments refers to the extent to which the environment replicates real-world conditions. High levels of realism can facilitate experiential learning by enabling learners to engage in authentic and contextually meaningful activities (Radianti et al., 2020).

According to self-regulated learning theory (Zimmerman, 2002), learners achieve better outcomes when they can control, monitor, and evaluate their own learning processes. Immersive environments may support this by providing greater autonomy, immediate feedback, and opportunities for active experimentation.

Furthermore, flow theory suggests that environments combining challenge, control, and feedback foster deep concentration and intrinsic enjoyment (Csikszentmihalyi, 1990), thereby reinforcing self-regulation.

RQ4. *How do learners perceive the potential role of realism in MeL environments in supporting self-regulated learning?*

2.6. Motivation and participation in synchronous learning

Participation in synchronous learning environments is a key indicator of online learning effectiveness (Hrastinski, 2008). Prior research shows that more motivated learners are more likely to engage actively and contribute to learning activities (Martin & Bolliger, 2018).

From a service perspective, participation can be interpreted as a manifestation of engagement and value co-creation (Vargo & Lusch, 2008). Therefore, environments that enhance motivation are expected to foster higher levels of participation.

RQ5. *How do learners perceive the relationship between motivation and their intention to participate in synchronous MeL sessions?*

2.7. Engagement and attendance

Engagement not only influences participation but also affects continuity in the learning process. Maintaining attendance in synchronous online sessions remains a major challenge for educational institutions (Redmond et al., 2018).

More dynamic and interactive environments can reduce digital fatigue and sustain learners' interest, thereby improving attendance and retention.

RQ6. *How do learners perceive the relationship between engagement and their intention to attend synchronous MeL sessions?*

2.8. Self-regulation and perceived learning effectiveness

Perceived learning effectiveness is closely linked to learners' ability to regulate their own learning processes (Zimmerman, 2002). When learners perceive a high level of control over their learning, they tend to evaluate outcomes more positively.

Immersive environments may strengthen this perception by enabling active interaction and continuous feedback.

RQ7. *How do learners perceive the relationship between self-regulated learning and perceived learning effectiveness in MeL environments?*

3. METHODOLOGY

3.1. Research design

This study adopts a qualitative, exploratory research design to investigate learners' perceptions, expectations, and anticipated behavioural intentions regarding MeL as a potential experiential service innovation in synchronous online education. Each research question guided the design of the interview protocol and the subsequent thematic analysis. Because MeL environments were not implemented within the empirical context of this study, the research focuses on how participants conceptualised the potential value of immersive learning environments based on their previous experience with conventional synchronous e-learning. In this context, a qualitative approach is particularly appropriate, as it enables an in-depth understanding of participants' expectations, interpretations, and evaluative judgements concerning emerging educational innovations that have not yet been empirically examined in the specific research setting (Creswell & Poth, 2018).

Accordingly, the findings should be interpreted as reflecting learners' perceptions, expectations, and anticipated behavioural intentions towards a proposed immersive learning environment rather than as empirical evidence of the educational effectiveness of MeL itself. The purpose of this study is therefore not to evaluate the outcomes of an implemented MeL environment, but to provide an initial exploratory understanding of how learners perceive its potential contribution to synchronous online education. This exploratory perspective supports the early conceptual development of MeL and provides an empirical foundation for future implementation-based and experimental research.

Qualitative research is especially suitable in emerging domains where theoretical development is still evolving and where the aim is to generate rich insights rather than to test causal relationships (Edmondson & McManus, 2007). In line with this perspective, the

present study seeks to generate an initial conceptual understanding of learners' expectations regarding immersive learning environments, identifying how they interpret the potential contribution of MeL to motivation, engagement, participation, self-regulated learning, and perceived learning effectiveness. Consequently, the findings should be understood as theory-building evidence intended to inform the future design, implementation, and empirical validation of MeL environments.

3.2. Research context and sample

The empirical context of this study is a synchronous online course on creative emotional intelligence delivered through a conventional e-learning platform. The course involved real-time interaction between the instructor and participants but did not incorporate immersive or three-dimensional elements.

The broader cohort consisted of 184 adult learners. From this population, a purposive subsample of 31 participants was selected for in-depth qualitative interviews. Purposive sampling was employed to ensure that the interviewees represented a broad range of demographic profiles and learning perspectives, considering characteristics such as gender, age, and the overall composition of the cohort. Rather than seeking statistical representativeness, this strategy aimed to include information-rich participants capable of providing diverse and meaningful reflections aligned with the objectives of the study (Patton, 2002). The final sample size was considered appropriate for an exploratory qualitative design, as it allowed sufficient diversity of perspectives while enabling an in-depth analysis of participants' perceptions and expectations regarding MeL.

The demographic composition of the overall cohort was predominantly female (62.6%), with most participants aged between 35 and 44 years (57.2%). The interview subsample was intentionally constructed to reflect this overall demographic profile while preserving variation across the main participant characteristics, thereby enhancing the breadth of perspectives captured during the interviews.

All participants had direct experience with conventional synchronous e-learning, enabling them to provide informed reflections on its strengths and limitations and to discuss their expectations regarding the potential contribution of MeL as an immersive alternative.

3.3. Data collection

Data were collected through semi-structured interviews conducted after the completion of the course. This method allows for a balance between consistency across interviews and flexibility to explore participants' individual perspectives in depth (Kvale & Brinkmann, 2009). The interview protocol (see Table 2) was designed to elicit reflections on (i) participants' experience in the synchronous e-learning environment, (ii) perceived levels of motivation, engagement, and participation, (iii) limitations of the current learning format, (iv) perceptions of immersive learning environments (MeL), and (v) expectations regarding how such environments might influence their learning experience.

Participants were encouraged to elaborate on their responses and provide examples where possible, allowing for the emergence of nuanced insights. Interviews were conducted iteratively, allowing preliminary analysis to be undertaken alongside data collection. Data collection ceased when thematic recurrence became evident, as successive interviews consistently reinforced previously identified themes and no substantially new conceptual categories emerged from the interview notes or post-

interview summaries (Guest et al., 2006). Given the exploratory nature of the study and the focus on participants' perceptions and expectations, thematic recurrence was considered an appropriate indicator that the data were sufficiently rich to address the research questions.

Table 2. Interview protocol

Dimension	Example questions
Learning experience	How would you describe your experience in the synchronous course?
Motivation	What factors influenced your motivation during the sessions?
Engagement	How engaged did you feel during the sessions?
Limitations	What limitations did you perceive in the current format?
Meta-e-learning (MeL)	How do you think an immersive environment would affect your experience?
Participation	Would it influence your willingness to participate or attend?

Interviews were documented through detailed notetaking during and immediately after each session. Participants' responses were captured as accurately as possible, including key statements and expressions, to preserve the meaning and richness of the data. Although audio-recording is generally recommended in qualitative research, detailed contemporaneous note-taking has been recognised as a feasible alternative in specific research contexts where recording is not possible or appropriate (Halcomb & Davidson, 2006).

Although interviews were not audio-recorded, particular care was taken to ensure data accuracy through contemporaneous note-taking and immediate post-interview elaboration. This procedure was intended to minimise information loss and to preserve the meaning of participants' responses as accurately as possible within the constraints of the study design.

As interviews were not audio-recorded, illustrative excerpts presented in the findings are based on reconstructed statements derived from contemporaneous notes rather than verbatim quotations.

3.4. Data analysis

The data were analysed using thematic analysis, following the six-phase approach proposed by Braun and Clarke (2006), which is widely recognised for its flexibility and rigour in qualitative research. The analysis began with a process of familiarisation, during which interview notes and post-interview summaries were read repeatedly to gain a comprehensive understanding of participants' narratives. Given the absence of verbatim transcripts, the thematic analysis focused on identifying recurring conceptual patterns across interview notes and post-interview summaries rather than on detailed linguistic or discourse analysis.

Subsequently, an open coding process was conducted to identify meaningful segments of data related to key concepts such as immersion, motivation, engagement, participation, realism, and perceived learning effectiveness. These initial codes were then systematically grouped into broader themes representing recurring patterns across interviews. The analytical process combined both inductive (data-driven) and deductive (theory-informed) approaches, allowing themes to emerge from the data while ensuring alignment with the conceptual framework underpinning the study.

Throughout the analytical process, newly coded interview notes were continuously compared with previously identified codes and themes to assess the recurrence of conceptual patterns across participants. This iterative process enabled the researchers to monitor whether additional interviews generated substantially new insights or merely reinforced existing categories. The consistent recurrence of themes across successive interviews supported the conclusion that the data were sufficiently rich to address the research questions and informed the decision to conclude data collection.

Following this, themes were reviewed and refined to ensure internal coherence and clear differentiation between them. Each theme was then clearly defined and linked to the corresponding research questions. Finally, the themes were interpreted in light of the theoretical framework, particularly the S-O-R model and the service experience perspective, enabling a structured understanding of how learners conceptualised the potential influence of experiential stimuli on psychological responses and anticipated behavioural intentions in MeL environments.

3.5. Reliability and validity

To ensure the rigour and trustworthiness of the findings, several strategies were employed in accordance with established qualitative research criteria (Lincoln & Guba, 1985). To enhance the trustworthiness of the study despite the absence of audio recordings, detailed contemporaneous notes were taken during each interview and expanded immediately afterwards. This procedure sought to preserve participants' intended meanings while reducing potential recall bias.

Dependability was ensured through a transparent and structured analytical process, including clearly defined coding procedures and iterative theme development. Confirmability was addressed by grounding all interpretations in the data and maintaining a consistent link between empirical observations and theoretical constructs, supported by an explicit audit trail of analytical decisions.

Transferability was facilitated by providing a detailed description of the research context, sample characteristics, and data collection procedures, allowing readers to assess the applicability of the findings to other settings. Furthermore, the combination of inductive and deductive coding strengthened the robustness of the analysis by balancing sensitivity to emergent insights with theoretical consistency.

3.6. Ethical considerations

Participation in the study was voluntary, and all participants provided informed consent prior to the interviews. Data were anonymised to ensure confidentiality, and no personally identifiable information was retained.

The study adhered to standard ethical guidelines for research involving human participants, ensuring respect, transparency, and data protection throughout the research process.

4. FINDINGS

The findings are structured according to the research questions developed in the theoretical framework, allowing for a systematic analysis of learners' perceptions of MeL.

The thematic analysis revealed a set of recurring conceptual patterns across participants' accounts regarding the perceived potential of MeL. While participants

consistently highlighted immersion, interactivity, and realism as the most salient experiential characteristics, their reflections also suggested that the educational value of these features would depend on how they were pedagogically integrated into the learning process. Overall, these experiential dimensions were associated with expectations of enhanced motivation, engagement, and self-regulated learning, which participants believed could subsequently encourage greater participation, attendance, and perceived learning effectiveness.

Although the interviews were not audio-recorded, the recurrence of themes across participants, together with the systematic documentation of interview notes, provided sufficient analytical consistency to support the interpretation of the findings.

4.1. Meta-e-Learning (MeL) as an enhanced experiential service (RQ1)

Participants consistently described traditional synchronous e-learning as functional but limited in experiential richness. While they acknowledged the convenience of real-time interaction, many perceived the experience as “flat”, “routine”, or “lacking involvement”.

In contrast, when reflecting on MeL environments, participants expressed a clear expectation of a more engaging and dynamic experience. The possibility of interacting within a three-dimensional space was associated with a stronger sense of presence and participation.

For instance, one participant described the current format as “useful, but somewhat repetitive”, while another suggested that a MeL environment would feel “more dynamic and closer to a real experience”.

From a service perspective, these perceptions suggest that participants viewed MeL not merely as a technological upgrade but as a potential transformation of the learning experience itself. At the same time, several participants emphasised that the educational value of immersive environments would ultimately depend on how such technologies were integrated into teaching practice, rather than on immersion alone. These reflections reinforce the idea that MeL should be understood as a pedagogically designed service experience in which value is co-created through meaningful interaction rather than generated by technology itself.

4.2. Immersion as a driver of motivation (RQ2)

A dominant theme across interviews was the perceived motivational potential of immersive environments. Participants frequently indicated that a more immersive setting would make learning “more stimulating”, “less monotonous”, and “more enjoyable”.

The absence of immersion in traditional e-learning was often linked to reduced attention and motivational fatigue, particularly in longer sessions. By contrast, immersive environments were expected to sustain interest and enhance the overall learning experience.

These perceptions are consistent with the role assigned to immersive stimuli within the S-O-R framework, whereby richer environmental characteristics are expected to foster more favourable psychological responses, particularly motivation. From the perspective of self-determination theory, participants generally anticipated that immersive environments could make learning more engaging and meaningful, thereby strengthening their intrinsic motivation. However, participants also suggested that these

motivational benefits would depend on the educational design of the learning environment and the extent to which immersive features supported meaningful learning activities rather than simply providing technological novelty.

For example, one participant described immersive environments as potentially more enjoyable and innovative, believing that such characteristics would make it easier to remain motivated and attend synchronous sessions on a regular basis.

4.3. Interactivity and learner engagement (RQ3)

Interactivity emerged as a central determinant of engagement. Participants highlighted that traditional e-learning often limits interaction to verbal exchanges or chat-based communication, which may not fully capture their attention or encourage active participation.

In contrast, MeL environments were perceived as enabling more natural and dynamic forms of interaction, including movement, collaboration, and real-time engagement with learning objects. Participants associated these features with higher levels of involvement and a stronger sense of active participation in the learning experience. One participant, for example, explained that greater opportunities for natural interaction would foster the feeling of being an active participant in the session rather than merely observing it.

From a service perspective, this reflects a shift from passive consumption to active participation, reinforcing the role of interactivity in value co-creation. Overall, participants perceived that increased interactivity could enhance both cognitive and emotional engagement, consistent with prior research on online learning environments.

4.4. Realism and self-regulated learning (RQ4)

Participants also emphasised the importance of realism in enhancing their learning experience. Realistic environments were perceived as more "authentic" and "closer to real-life situations", which participants associated with better understanding and retention.

Importantly, realism was linked to a greater sense of control over the learning process. Participants anticipated that immersive environments would enable them to learn through active exploration, interact more freely with learning materials, and progress at their own pace. They also emphasised the importance of autonomy, suggesting that greater opportunities for exploration and interaction could facilitate understanding while allowing them to regulate their own learning process more effectively.

These perceptions are consistent with self-regulated learning theory, as participants described processes related to autonomy, control, and active exploration. Additionally, participants perceived that the combination of realism and interactivity could facilitate conditions associated with flow, such as greater concentration and involvement.

4.5. Motivation and participation (RQ5)

Participants consistently perceived higher motivation as being associated with a greater willingness to participate in synchronous sessions. Many reported that, in traditional e-learning environments, reduced motivation often led to passive attendance or limited interaction.

In contrast, participants expected immersive environments to encourage more active participation. Participants suggested that a more engaging environment could increase their willingness to contribute during synchronous sessions, reduce their tendency to disengage, and encourage more active involvement in discussions. For example, one participant explained that a more engaging environment would make learners feel more inclined to participate actively rather than simply listen to the session.

These perceptions are consistent with the proposed theoretical framework, in which participants anticipated that enhanced motivation could translate into stronger behavioural intentions to participate.

4.6. Engagement and attendance (RQ6)

Participants also perceived engagement as being closely associated with regular attendance. Participants indicated that maintaining consistent attendance in synchronous sessions can be challenging, particularly when sessions are perceived as repetitive or insufficiently stimulating.

Participants perceived that MeL environments would be more likely to sustain attention over time and, consequently, could increase their willingness to attend synchronous sessions on a regular basis. Participants suggested that a more immersive and interactive format could reduce boredom and make synchronous sessions more appealing. One participant, for example, considered that a more immersive learning environment would increase the attractiveness of the sessions and reduce the likelihood of missing them.

From a service perspective, these perceptions highlight the importance that participants attributed to experiential quality as a factor that could encourage continued engagement with the learning service.

4.7. Self-regulation and perceived learning effectiveness (RQ7)

Finally, participants perceived immersive learning environments as having the potential to enhance learning outcomes. Participants primarily attributed this expectation to the greater autonomy and active involvement that immersive environments were perceived to facilitate during the learning process.

Participants indicated that environments allowing exploration, interaction, and immediate feedback could facilitate a better understanding and retention of information. These perceptions suggest that self-regulated learning processes may play an important role in shaping learners' expectations regarding learning effectiveness. For example, one participant explained that learning through active engagement would be more likely to facilitate information retention than simply listening to the instructional content.

Importantly, these perceptions extended beyond content acquisition to encompass the overall learning experience, reinforcing participants' belief that experiential factors could contribute to more effective learning processes.

Taken together, these findings should be interpreted as reflecting learners' perceptions and expectations regarding the potential educational value of MeL rather than as evidence of the effectiveness of an implemented immersive learning environment.

4.8. Methodological reflection

Given that interviews were not audio-recorded, the findings are based on detailed contemporaneous note-taking and systematic post-interview documentation of participants' responses. Although this approach limited the availability of verbatim accounts, the iterative comparison of interview notes and the recurrence of conceptual patterns across participants provided sufficient analytical consistency to support the interpretation of the findings. Consequently, the results should be understood as reflecting learners' perceptions and expectations regarding the potential value of MeL rather than as direct evidence of the effectiveness of an implemented immersive learning environment.

Table 3 shows findings summary.

Table 3. Summary of the thematic findings

Research question	Key findings	Theoretical link
RQ1	Participants perceived MeL as a potentially more immersive and participatory learning environment	Service experience
RQ2	Participants anticipated that immersion could enhance motivation	Self-determination theory
RQ3	Participants perceived that interactivity could strengthen engagement	Service-Dominant logic
RQ4	Participants perceived that realism could support self-regulated learning	Flow theory
RQ5	Participants associated higher motivation with stronger intentions to participate	S-O-R
RQ6	Participants associated greater engagement with stronger intentions to attend synchronous sessions	Engagement literature
RQ7	Participants perceived self-regulated learning as contributing to expected learning effectiveness	Self-regulated learning theory

5. DISCUSSION, CONTRIBUTION AND IMPLICATIONS

This study set out to explore how learners perceive MeL as an immersive and experiential alternative to conventional synchronous e-learning. Rather than evaluating the effectiveness of an implemented MeL environment, the study examined learners' perceptions, expectations, and anticipated behavioural intentions regarding the potential educational value of immersive learning environments. The findings suggest that participants viewed MeL not merely as a technological enhancement, but as a pedagogically meaningful evolution of the learning experience. Participants anticipated that immersive environments could contribute to higher levels of motivation, engagement, participation, and perceived learning effectiveness, although these perceptions should be interpreted within the exploratory scope of the study rather than as evidence of the educational effectiveness of MeL itself.

5.1. Meta-e-Learning (MeL) as a service innovation

One of the primary contributions of this study lies in conceptualising MeL as a form of service innovation. From a service perspective, learning is not simply the transmission of knowledge, but an experience co-created through interactions between the learner and the environment (Vargo & Lusch, 2008; Lemon & Verhoef, 2016). From this perspective, MeL can be understood as a service innovation that reconfigures the

learning service system through new forms of interaction, participation, and experiential value creation (Helkkula et al., 2018).

Participants perceived MeL as having the potential to strengthen this co-creation process by increasing learner involvement and creating richer educational experiences. Rather than being viewed solely as a technological advancement, MeL was consistently associated with greater opportunities for active participation, experiential richness, and an enhanced sense of presence. Importantly, participants also suggested that these potential benefits would depend on the pedagogical design of the learning environment and the meaningful integration of immersive technologies into teaching practice.

These findings position MeL within the broader transformation of digital services towards more immersive and participatory experiences, where perceived value is increasingly generated through interaction and co-creation rather than through access to technology alone.

5.2. Extending the Stimulus–Organism–Response (S-O-R) framework

This study contributes to extending the application of the S-O-R framework to immersive online learning by exploring how learners interpret the experiential characteristics of MeL as meaningful environmental stimuli. Within this perspective, participants perceived immersion, interactivity, and realism as the principal experiential features that could influence psychological responses, particularly motivation, engagement, and self-regulated learning.

Participants further anticipated that these psychological responses could be associated with stronger behavioural intentions, including greater willingness to participate in synchronous sessions, maintain regular attendance, and perceive the learning experience as more effective. Consequently, the findings provide exploratory evidence regarding how learners conceptualise the relationships proposed by the S-O-R framework within the context of immersive synchronous learning.

By applying the S-O-R model to online education through an experiential service perspective, the study contributes to broadening its application beyond traditional consumer and service contexts while emphasising the central role of learning experience design in shaping learners' perceptions of value.

5.3. The role of immersion in enhancing intrinsic motivation

Participants consistently anticipated that immersive learning environments could enhance their intrinsic motivation by making learning experiences more interesting, enjoyable, and meaningful. These perceptions are consistent with Self-Determination Theory (Deci & Ryan, 2000), which proposes that intrinsic motivation is strengthened when learning activities are experienced as engaging and personally meaningful.

Rather than suggesting that immersion alone guarantees motivational improvements, participants emphasised that immersive technologies would be most valuable when integrated into pedagogically meaningful learning activities. From a service perspective, these findings highlight the importance learners attribute to experiential quality as a factor that could enhance the perceived value of educational services.

5.4. Interactivity as a mechanism for engagement and value co-creation

Interactivity emerged as one of the most salient experiential characteristics through which participants expected learner engagement to be strengthened. Participants perceived opportunities for natural interaction with learning materials, instructors, and peers as essential for transforming synchronous online learning into a more participatory educational experience.

These perceptions are consistent with Service-Dominant Logic, which conceptualises value as emerging through interaction and co-creation rather than passive consumption (Vargo & Lusch, 2008). In this sense, participants viewed MeL as providing conditions that could facilitate a more active learner role within the educational process, reinforcing the importance of experience design in digitally mediated learning environments.

5.5. Realism and self-regulated learning

Participants also perceived realistic learning environments as potentially supportive of self-regulated learning processes. Greater opportunities for exploration, interaction, and immediate feedback were associated with increased autonomy and with the possibility of learning through active engagement rather than passive observation.

These perceptions are consistent with Flow Theory (Csikszentmihalyi, 1990) and Self-Regulated Learning Theory (Zimmerman, 2002), both of which emphasise the importance of autonomy, feedback, and active participation. Rather than demonstrating actual improvements in self-regulation, the findings indicate that participants expected immersive environments to create conditions that could facilitate deeper and more autonomous learning processes.

5.6. From psychological responses to behavioural outcomes

A key insight emerging from this study is that participants consistently perceived psychological responses and behavioural intentions as closely related when reflecting on the potential implementation of MeL. Higher anticipated motivation and engagement were associated with stronger intentions to participate actively in synchronous sessions and to maintain regular attendance.

These findings are particularly relevant within online education, where sustaining learner participation continues to represent an important challenge. Participants anticipated that improvements in experiential quality could encourage stronger engagement with learning activities, although they also recognised that effective pedagogical design would remain essential for achieving these outcomes.

From a service perspective, these anticipated behavioural intentions may be interpreted as indicators of learners' willingness to engage more actively in value co-creation within immersive educational environments.

5.7. Integrating education and service marketing perspectives

Finally, this study contributes to bridging educational research and service marketing by conceptualising immersive online learning as an experiential service rather than solely as a technological innovation. While previous studies have primarily examined immersive learning from technological or pedagogical perspectives, the present research proposes an integrated conceptual framework that incorporates service experience, learner engagement, and value co-creation into the analysis of immersive educational environments.

This interdisciplinary perspective contributes to the theoretical development of MeL by highlighting how concepts traditionally associated with service marketing—including customer experience, engagement, and value co-creation—may also provide valuable insights for understanding digitally mediated learning processes.

The findings should therefore be interpreted within the exploratory scope of the present study. Rather than demonstrating the effectiveness of an implemented MeL environment, this research provides an initial conceptual understanding of how learners perceive and anticipate the potential educational value of immersive synchronous learning. These insights contribute to the ongoing theoretical development of MeL and

establish a foundation for future experimental and implementation-based research capable of evaluating its educational effectiveness in authentic educational settings.

5.8. Theoretical contributions

This study makes several theoretical contributions at the intersection of online education, immersive learning, educational psychology, and service marketing (see Table 4). Given the exploratory nature of the research, these contributions should be understood primarily as conceptual and theory-building rather than as confirmatory evidence of the effectiveness of MeL.

Table 4. Theoretical contributions

Area	Prior literature	Contribution of this study
E-learning	Focus on content delivery	Introduces experiential MeL
Immersive learning	Tech-focused	Service perspective
S-O-R	Consumer contexts	Extended to education
Service marketing	Commercial services	Applied to education
Educational psychology	Motivation and self-regulated learning	Explores learners' perceptions of immersive learning processes

First, the study contributes by further developing the conceptualisation of MeL as an experiential framework for immersive synchronous learning. Rather than proposing a new technological platform, MeL is presented as a pedagogical and service-oriented conceptual model that integrates immersion, interactivity, realism, learner participation, and value co-creation within a coherent educational framework. By explicitly differentiating MeL from immersive virtual learning environments, educational metaverse platforms, and three-dimensional virtual worlds, the study contributes to clarifying its conceptual positioning within the broader literature on immersive digital education.

Second, the study contributes to service research by conceptualising immersive online learning as an experiential service. Participants consistently perceived immersive environments as offering greater opportunities for interaction, engagement, and value co-creation. Rather than demonstrating that such outcomes occur in implemented MeL environments, the study provides exploratory evidence regarding how learners anticipate these service characteristics and their potential educational value. In doing so, the research extends the principles of Service-Dominant Logic (Vargo & Lusch, 2008) to the conceptual analysis of immersive digital education.

Third, the study contributes to the application of the S-O-R framework (Mehrabian & Russell, 1974) within immersive online education. Rather than empirically validating causal relationships, the findings provide an exploratory understanding of how learners perceive the experiential characteristics of MeL as environmental stimuli that may influence psychological responses and anticipated behavioural intentions. Consequently, the study offers an initial conceptual application of the S-O-R framework to immersive synchronous learning that may inform future experimental research.

Fourth, the study contributes to educational psychology by exploring learners' perceptions regarding the potential role of immersive environments in supporting intrinsic motivation and self-regulated learning. Although these expectations require empirical validation through implemented immersive learning environments, the findings provide useful theoretical insights into how learners conceptualise the relationships proposed by Self-Determination Theory (Deci & Ryan, 2000) and Self-Regulated Learning Theory (Zimmerman, 2002) within digitally mediated educational experiences.

Fifth, the study contributes methodologically by adopting an exploratory qualitative design suitable for the early stages of conceptual development. By focusing on learners' perceptions, expectations, and anticipated behavioural intentions, the research generates theory-building insights that may guide subsequent implementation-based and experimental studies. This approach responds to recommendations advocating exploratory research during the initial development of emerging theoretical constructs (Edmondson & McManus, 2007).

Finally, the study contributes by strengthening the dialogue between educational research and service marketing. Conceptualising learning as an experiential service highlights the relevance of engagement, value co-creation, and user experience for understanding immersive educational environments. This interdisciplinary perspective broadens existing conceptualisations of digital education while opening new opportunities for future research on immersive learning, educational innovation, and digitally mediated service experiences.

5.9. Managerial implications

The findings of this exploratory study offer several implications for practitioners involved in the design and delivery of online education services, particularly within university programmes in Business Administration, Accounting, Finance, and related disciplines, where active participation, collaboration, and experiential learning are increasingly recognised as essential components of students' professional development.

First, participants consistently perceived immersive learning environments as offering a richer educational experience than conventional synchronous e-learning. These perceptions suggest that educational institutions may benefit from considering online learning as an experiential service rather than solely as a mechanism for content delivery. Consequently, universities and training providers may wish to complement traditional efficiency-oriented approaches with learning designs that place greater emphasis on learner engagement, interaction, and experiential value.

Second, participants anticipated that immersive learning environments could strengthen learners' motivation by increasing their sense of presence and involvement. Although these expectations require validation through implemented MeL environments, they suggest that investments in immersive technologies—including three-dimensional learning platforms, virtual environments, and other interactive digital tools—may contribute to creating more engaging educational experiences when supported by appropriate pedagogical design.

Third, participants consistently associated greater interactivity with stronger engagement and participation. These perceptions highlight the importance of designing synchronous online learning environments that encourage meaningful interaction among learners, instructors, and educational content. Rather than relying primarily on lecture-based delivery, educators may consider incorporating collaborative activities, real-time discussions, problem-based learning, and other participatory strategies that support learner involvement.

Fourth, participants perceived realistic and interactive learning environments as potentially supportive of autonomous learning and self-regulation. These perceptions suggest that educational activities incorporating authentic scenarios, simulations, and experiential tasks may help learners engage more actively with the learning process, particularly in disciplines where applied decision-making and problem-solving are essential professional competences.

Fifth, participants anticipated that improvements in the experiential quality of synchronous learning environments could encourage stronger intentions to participate regularly in online sessions. While these perceptions do not demonstrate actual

improvements in attendance or retention, they indicate that enhancing learners' educational experience may represent a promising direction for institutions seeking to strengthen student engagement in online programmes.

Finally, from a service perspective, the findings suggest that MeL provides a useful conceptual framework for designing immersive educational experiences centred on learner participation and value co-creation. Rather than viewing immersive technologies as an end in themselves, educational institutions should consider them as pedagogical resources whose educational value depends on their thoughtful integration into learning design. In this sense, the successful implementation of MeL is likely to depend not only on technological investment but also on instructional design, faculty development, and the alignment of immersive experiences with clearly defined learning objectives.

6. CONCLUSIONS

This study explored learners' perceptions, expectations, and anticipated behavioural intentions regarding the potential of MeL as an experiential service framework for synchronous online education. Rather than evaluating an implemented immersive learning environment, the research examined how adult learners conceptualised the potential educational value of immersion, interactivity, and realism when compared with conventional synchronous e-learning. The findings indicate that participants consistently perceived these experiential characteristics as having the potential to foster greater motivation, engagement, participation, self-regulated learning, and perceived learning effectiveness.

From a theoretical perspective, the study contributes by further developing the conceptualisation of MeL as a pedagogical and service-oriented framework that integrates immersive learning, educational psychology, and service marketing. By positioning online learning as an experiential service in which value is co-created through learner participation and interaction, the research extends existing discussions on immersive digital education while offering an exploratory application of the S-O-R framework to synchronous online learning.

Nevertheless, the findings should be interpreted within the exploratory scope of the study. Because participants had not experienced an implemented MeL environment, the results reflect learners' perceptions and expectations regarding its potential educational value rather than empirical evidence of its educational effectiveness. Consequently, the study should be understood as an initial theory-building contribution that supports the conceptual development of MeL and provides a foundation for future implementation-based and experimental research.

Future studies should evaluate MeL in authentic educational settings involving fully implemented immersive learning environments. Such research would enable the examination of actual learning outcomes, behavioural responses, and educational effectiveness across different disciplinary contexts, including Business Administration, Accounting, and Finance, thereby further clarifying the pedagogical and managerial value of immersive synchronous learning.

6.1. Limitations and future research

This study presents several limitations that should be considered when interpreting its findings and that provide valuable directions for future research.

First, the study explored learners' perceptions, expectations, and anticipated behavioural intentions regarding MeL rather than evaluating an implemented immersive learning environment. Consequently, the findings should be interpreted as reflecting participants' conceptualisations of the potential educational value of MeL rather than as empirical evidence of its educational effectiveness. Future research should therefore examine fully implemented MeL environments in authentic educational settings to determine whether these perceived benefits are reflected in actual learning behaviours and educational outcomes.

Second, the qualitative and exploratory nature of the study was appropriate for the early conceptual development of MeL but inevitably limits the transferability of the findings beyond the specific research context. The study was conducted within a synchronous online course on creative emotional intelligence involving adult learners. Future studies should replicate this research across different disciplinary contexts—including Business Administration, Accounting, Finance, and other higher education programmes—as well as across different educational levels and cultural settings to further examine the applicability of the proposed framework.

Third, although rigorous qualitative procedures were followed throughout the study, the interviews were not audio-recorded. Instead, the analysis relied on detailed contemporaneous note-taking and systematic post-interview documentation. While these procedures sought to preserve participants' intended meanings, the absence of verbatim transcripts limited the possibility of conducting more detailed linguistic or discourse-level analyses. Future qualitative studies could therefore incorporate audio-recorded and fully transcribed interviews to strengthen analytical depth and transparency.

Fourth, the present research focused exclusively on learners' perceptions and did not examine the potential influence of individual or contextual variables that may shape responses to immersive learning environments. Variables such as age, digital competence, prior experience with immersive technologies, learning preferences, disciplinary background, or technological self-efficacy may influence how learners perceive and engage with MeL and therefore warrant further investigation.

Finally, the conceptual framework proposed in this study should be subjected to empirical validation using complementary methodological approaches. Future research could employ experimental, quasi-experimental, longitudinal, or mixed-methods designs to examine the relationships between immersion, interactivity, realism, psychological responses, behavioural intentions, and objective educational outcomes. Such studies would not only strengthen the empirical validation of MeL but also clarify the conditions under which immersive learning environments create educational value in different learning contexts.

Statement on the use of artificial intelligence

In the preparation of this article, ChatGPT (OpenAI) was used as a support tool for the analysis, synthesis, and refinement of the text. AI was specifically employed to: (1) review and analyse preliminary drafts, identifying structural strengths and weaknesses; (2) integrate and synthesise content from multiple source documents; (3) suggest improvements to argumentative coherence and expository clarity; and (4) assist in the correction and terminological standardization of the final text. At all times, the authors have maintained intellectual control of the project, making all conceptual, methodological, and editorial decisions. The theoretical framework, the experimental proposal, the conclusions, and the overall orientation of the article are entirely the

responsibility of the authors. AI functioned as a cognitive amplification tool without replacing critical thinking or the final intellectual responsibility for the academic content produced.

Declarations

Conflicts of interest/Competing interests

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