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APPLICATION OF INTERACTIVE DIGITAL LEARNING TECHNOLOGIES IN VETERANS' VOCATIONAL TRAINING FOR THE TOURISM AND HOSPITALITY INDUSTRY

Abstract. The professional reintegration of veterans is a major challenge for Ukraine's post-war recovery and requires vocational education aligned with labour market needs. The tourism and hospitality industry offers employment opportunities, but transition to civilian work requires sector-specific knowledge, digital competence, communication, teamwork, decision-making and adaptability.

The study aims to develop and theoretically substantiate a conceptual model for integrating interactive digital learning technologies into veterans' vocational education for employment in the tourism and hospitality industry. The methodology combines secondary analysis of a sociological survey conducted by the Ukrainian Veterans Fund and the Rating Sociological Group in December 2025 among 240 respondents, competency mapping and a systematic literature review.

The analysis identified transferable military competencies, including discipline, teamwork under pressure, logistical planning and decision-making in dynamic situations. It also revealed gaps in customer orientation, digital literacy and personalised service. The proposed model links veterans' competencies and educational needs with labour market requirements through interactive technologies, including problem-based, case-based, simulation-based and scenario-based learning, microlearning, the flipped classroom, Learning Management Systems, Virtual Reality, Augmented Reality and Geographic Information Systems.

The model provides a framework for translating military experience into civilian professional competencies and supports vocational programmes for veterans seeking employment in the tourism and hospitality industry. Its application may strengthen employability, facilitate social reintegration and contribute to Ukraine's post-war recovery. Further research should validate the model through implementation and evaluation.

Keywords: veterans; vocational education; tourism and hospitality industry; interactive digital learning technologies; competency mapping; professional reintegration.

1. INTRODUCTION

Problem Statement. The large-scale transition of veterans to civilian life has created new challenges for vocational education systems. Beyond employment itself, successful reintegration depends on opportunities to acquire new professional competencies that correspond to labour market needs and enable sustainable career development.

The tourism and hospitality industry represents one of the sectors capable of offering flexible employment pathways; however, professional activity in this field requires a combination of communication, customer service, digital, organisational and problem-solving competencies that cannot be developed effectively through conventional knowledge-oriented instruction alone.

At the same time, vocational education is undergoing rapid digital transformation. Interactive digital learning technologies have fundamentally changed the way professional competencies are developed by enabling experiential learning, authentic simulations, adaptive instruction and continuous feedback. Rather than serving as supplementary teaching resources, digital technologies are becoming an integral component of competency-based education, allowing learners to practise real-life professional situations in safe and flexible learning

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environments. Nevertheless, the educational potential of these technologies depends not on their availability but on their pedagogically justified integration into the learning process.

Despite growing interest in digital education and veterans' professional reintegration, these research areas have largely evolved independently. Existing studies rarely consider how interactive digital learning technologies can be systematically integrated into vocational education programmes designed specifically for veterans entering service-oriented industries such as tourism and hospitality. This creates a significant gap between technological capabilities and educational practice, highlighting the need for evidence-informed approaches that support competency development while addressing the educational characteristics and professional transition of veteran learners.

Analysis of Recent Research and Publications. Research on veterans' reintegration and digital education has expanded considerably in recent years, yet the two fields continue to develop largely in parallel. Digital learning is widely recognised as an instrument that improves access to education, supports lifelong learning and facilitates social adaptation for veterans returning to civilian life [1].

Electronic learning technologies have further been shown to combine professional retraining with elements of social and psychological support, thereby addressing both skills development and adjustment challenges [2]. Parallel research on the digitalisation of social services emphasises the potential for more coordinated educational, social and employment provision within comprehensive reintegration programmes [3]. While these studies establish the practical value of digital tools, they predominantly treat technology as a means of access and delivery rather than as a pedagogically structured component of competency-based vocational education.

Crisis-related scholarship in Ukraine has demonstrated that resilient digital infrastructure, adaptive instructional methods and institutional preparedness are essential for maintaining educational continuity under martial law [4]. Concurrent transformations within military education have accelerated the introduction of innovative pedagogical technologies aimed at improving the quality, adaptability and resilience of professional training [5]. Broader research on digital transformation in higher education has examined blended learning models that integrate synchronous and asynchronous formats [6] and has underlined the necessity of systematic digital competency development among both educators and learners [7].

However, they rarely address the specific competency profiles required for transition into civilian service-oriented sectors such as tourism and hospitality, nor do they examine how prior military experience can be systematically recognised within civilian curricula.

Within tourism education, integrative learning technologies and innovative pedagogical approaches are reported to strengthen practical skills, promote active learning and improve alignment with labour market requirements [8], [9].

Adult education research complements these findings by highlighting the diversity of motivational profiles among adult learners and the consequent need for flexible, personalised educational pathways [10]. Equity of access to digital infrastructure and inclusive learning environments remains a critical determinant of successful outcomes in distance and lifelong learning systems [11]. Although these studies provide valuable insights into effective pedagogical design, the majority examine generic student populations. Few consider the distinctive educational characteristics of veterans or the potential for transferring military-acquired competencies into tourism and hospitality roles.

International research has broadened the conceptualisation of veterans' reintegration beyond employment outcomes, emphasising identity reconstruction, cultural adaptation, psychological adjustment, community participation and long-term institutional support [13], [14].

Economic reintegration has become a major research direction, with entrepreneurship

widely recognised as an important pathway for veterans' transition to civilian employment. Existing studies demonstrate that social entrepreneurship creates sustainable employment opportunities while generating social value and strengthening community resilience [15]. Research also highlights the contribution of investment programmes, financial support and institutional partnerships to the development of veteran-owned businesses [16]. Studies conducted in Ukraine emphasise the importance of supportive regulatory frameworks, entrepreneurial ecosystems and fiscal mechanisms for ensuring business resilience under contemporary economic challenges [17]. Recent evidence further highlights the contribution of fiscal instruments to strengthening the resilience of veteran enterprises under conditions of economic instability, environmental pressures and energy insecurity [18]. Comparative studies identify social entrepreneurship as a long-term instrument for promoting entrepreneurial activity, social inclusion and sustainable labour market participation [19].

In the tourism and hospitality industry itself, digital platforms, cloud services, mobile applications and other technological solutions are acknowledged as drivers of competitiveness and as expanding the scope for professional training [20], [21]. Yet existing work stops short of specifying how interactive digital learning technologies can be systematically aligned with the dual challenge of addressing veterans' heterogeneous educational needs and meeting the competency requirements of the tourism and hospitality industry.

Taken together, the literature reveals three persistent limitations. First, digital education, veterans' reintegration, tourism pedagogy and economic reintegration continue to be investigated as largely separate domains, with limited interdisciplinary synthesis. Second, the majority of studies remain descriptive; systematic comparison of alternative pedagogical approaches, critical evaluation of their strengths and limitations, and explicit identification of unresolved issues are comparatively rare. Third, no integrated conceptual model currently links veterans' educational needs, military-acquired competencies, labour market requirements in tourism and hospitality, and the pedagogical affordances of interactive digital learning technologies. This interdisciplinary gap defines the focus of the present study.

Aim and Objectives of the Study. The aim of this study is to develop and theoretically substantiate a conceptual model for integrating interactive digital learning technologies into veterans' vocational training for employment in the tourism and hospitality industry through the alignment of pedagogical approaches, veterans' educational needs and industry competency requirements.

2. RESEARCH METHODOLOGY

2.1. Design

This study employed a qualitative analytical research design based on secondary empirical data analysis, competency mapping and pedagogical synthesis. The research aimed to investigate how interactive digital learning technologies can facilitate the professional preparation of veterans for employment in the tourism and hospitality industry through the alignment of educational demand, labour market requirements and competency-based vocational education.

The methodological logic of the study followed a sequential, evidence-informed analytical process designed to bridge empirical findings on veterans' educational needs with labour market requirements and the pedagogical affordances of interactive digital learning technologies. Rather than relying on isolated examination of individual elements, the research adopted an integrated approach in which survey data described by the organisers as nationally representative within the accessible territories of Ukraine (n = 240, maximum sampling error 6.3%) served as the foundation for subsequent stages of analysis.

This ensured that all recommendations remained firmly grounded in the lived realities of Ukrainian veterans while responding to the specific demands of the tourism and hospitality industry.

Competency mapping constituted the pivotal analytical step, enabling the translation of veterans' heterogeneous educational needs into clearly defined, sector-relevant professional competencies. Through systematic comparison and qualitative matching, military-acquired attributes were aligned with employer expectations, revealing both transferable strengths and areas requiring targeted development.

The overall research framework thus comprised five interrelated stages:

1) Extraction of key educational indicators from secondary data;
2) Competency mapping;
3) Critical analysis of interactive digital learning technologies;
4) Analytical synthesis;
5) The formulation of practical recommendations for programme design.

2.2. Data Sources

The empirical foundation of the study was provided by the nationwide survey of veterans conducted by the Ukrainian Veterans Fund in cooperation with the Rating Sociological Group in December 2025. The survey included 240 respondents aged 18 years and above, representing all regions of Ukraine except the temporarily occupied territories [22], [23].

Only variables directly related to vocational education were selected for analysis, including demand for further education, learning motivation, preferred characteristics of educational programmes, employment expectations and preferred learning conditions. These data were complemented by a systematic review of peer-reviewed literature, focusing on three key domains: veterans' vocational reintegration, competency requirements in tourism and hospitality and interactive digital learning technologies. The integration of recent empirical evidence with current scholarly literature allowed for a contextualised interpretation of veterans' educational needs within a competency-based framework.

2.3. Competency Mapping Procedure

Competency mapping constituted the central analytical procedure of the study and served as the principal methodological bridge between veterans' educational needs, military-acquired competencies and the professional requirements of the tourism and hospitality industry. The procedure was designed to ensure methodological transparency and to enable the systematic identification of both transferable strengths and competency gaps.

The mapping process followed a sequential four-stage algorithm:

Stage 1. Identification of veterans' educational needs.

Primary empirical input was derived from the nationwide survey of veterans conducted by the Ukrainian Veterans Fund in cooperation with the Rating Sociological Group in December 2025 (n = 240). The selected variables included: demand for further education, primary motivation for learning (personal development, career change), preferred programme characteristics (employment opportunities, flexibility to combine study with work) and preferred learning conditions. These data were complemented by a systematic review of scholarly literature on veterans' professional reintegration and adult learning needs.

Stage 2. Identification of labour market competency requirements.

Competency profiles expected by employers in the tourism and hospitality industry were established through a critical synthesis of recent peer-reviewed publications on tourism and hospitality education, industry reports and competency frameworks. The major competency domains identified were: communication competence, customer orientation, teamwork, digital

competence (including property management systems, reservation platforms and CRM tools), adaptability, problem-solving and decision-making under dynamic conditions.

Stage 3. Qualitative matching and gap analysis.

Each educational need identified in Stage 1 was systematically compared with the competency domains defined in Stage 2 through iterative qualitative matching. The comparison was guided by the following criteria:

- Relevance of the identified needs to professional performance in tourism and hospitality;
- Transferability of military-acquired attributes (discipline, responsibility, teamwork under pressure, logistical planning, risk assessment, decision-making in uncertain environments);
- Presence or absence of corresponding competencies in the veteran population.

This process revealed two categories of outcomes:

- Transferable competencies – military-acquired attributes that already align with industry requirements and can be recognised and built upon;
- Competency gaps – areas requiring targeted development, primarily customer orientation, digital competence, personalised service delivery and cultural adaptability.

Stage 4. Establishment of pedagogical and technological relationships.

In the final stage, the identified needs, transferable competencies and gaps were linked to specific interactive digital learning technologies and pedagogical approaches. The relationships presented in Tables 2–4 were derived through analytical synthesis that integrated:

- Empirical survey data on veterans' educational priorities;
- Competency mapping results;
- Pedagogical affordances of interactive digital learning technologies reported in the literature;
- The author's expert interpretation of how these technologies can support the transfer of military experience into civilian professional contexts.

The outcome of this four-stage procedure is an evidence-informed conceptual model that systematically connects veterans' educational needs, military-acquired competencies, labour market requirements and interactive digital learning technologies.

2.4. Analysis of Interactive Digital Learning Technologies

Following competency mapping, the selected interactive digital learning technologies were evaluated according to their pedagogical capacity to support the development of the identified competencies. The analysis was guided by three principal criteria: the authenticity of professional learning situations, the level of learner engagement and active participation, and the potential for meaningful competency development within vocational education.

The study examined a range of established and emerging approaches, including Problem-Based Learning, Case-Based Learning, Simulation-Based Learning, Scenario-Based Learning, microlearning, the flipped classroom, Learning Management Systems, adaptive learning, Virtual Reality, Augmented Reality, interactive multimedia and Geographic Information Systems. Each technology was assessed not in isolation but in terms of its contribution to bridging the gap between veterans' prior experience and the practical demands of the tourism and hospitality industry.

2.5. Analytical Synthesis

The final stage of the study integrated the empirical findings, competency mapping results and pedagogical analysis into a coherent conceptual model. This synthesis was achieved through iterative comparison of the survey data, theoretical insights from the literature and

identified competency requirements. Rather than seeking statistical correlations, the analysis focused on establishing pedagogically justified relationships between veterans' educational needs and the affordances of interactive digital learning technologies.

The outcome of this synthesis included an evidence-informed conceptual model for curriculum design and practical recommendations for vocational education providers.

2.6. Framework

The methodological framework of the study followed a clear sequential logic (Figure 1).

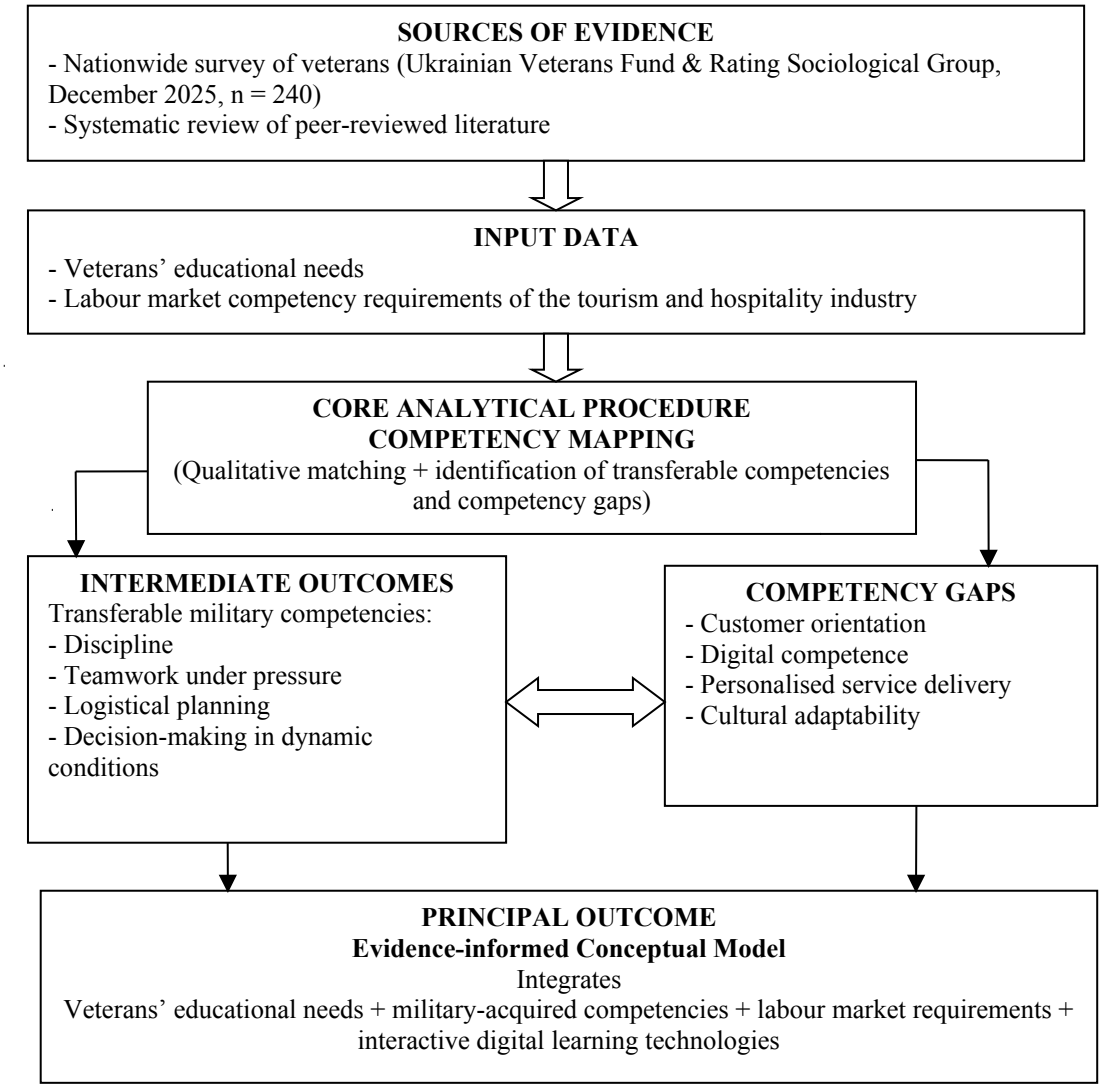


Fig. 1. Research design of the study: sequential evidence-informed process leading to the conceptual model

Finally, analytical synthesis generated theoretically grounded and practically applicable recommendations for competency-based vocational education programmes supporting veterans' reintegration into the tourism and hospitality industry.

This structured approach ensured methodological consistency and coherence throughout the research process.

2.7. Trustworthiness of the Analysis

To strengthen the trustworthiness of the findings, the study employed methodological triangulation by drawing on three complementary sources of evidence: nationally representative empirical data on veterans' educational needs, contemporary peer-reviewed literature on veterans' reintegration and tourism education and detailed competency-based pedagogical analysis. The convergence of these sources enhanced the analytical validity and reduced dependence on any single data source.

2.8. Study Limitations

This study is subject to several limitations. The proposed conceptual model is based on secondary data, including recent national reports and peer-reviewed literature, rather than primary empirical data collected specifically for this research. The model should be regarded as an evidence-informed conceptual model that requires further empirical validation in vocational education settings. In addition, the competency mapping process was conducted through qualitative synthesis and expert interpretation, which may be refined through future quantitative validation and longitudinal evaluation.

Despite these limitations, the integration of recent nationally representative evidence with contemporary research provides a solid foundation for understanding veterans' educational needs and supports the design of competency-based vocational training programmes for the tourism and hospitality industry.

3. RESEARCH RESULTS

3.1. Analysis of Veterans' Educational Needs

Designing effective vocational education programmes for veterans requires a clear understanding of their educational needs. Veterans enter civilian life with diverse professional backgrounds, educational attainment, career aspirations and socio-economic circumstances, resulting in highly differentiated learning demands. Standardised educational approaches are unlikely to support successful vocational reintegration. Identifying the structure of veterans' educational needs therefore provides an essential foundation for developing responsive vocational training programmes, including those preparing specialists for the tourism and hospitality industry.

The analytical basis of this assessment was provided by the findings of a nationwide survey of veterans conducted by the Rating Sociological Group with the support of the Ukrainian Veterans Fund in December 2025. The survey included 240 respondents aged 18 years and over from all regions of Ukraine except the temporarily occupied territories. The sampling error did not exceed 6.3 per cent [22], [23].

According to the findings of the Ukrainian Veterans Fund and the Rating Sociological Group, 25 per cent of veterans reported a need to pursue further education after completing military service, whereas 75 per cent indicated no such need (Figure 2; Table 1) [23].

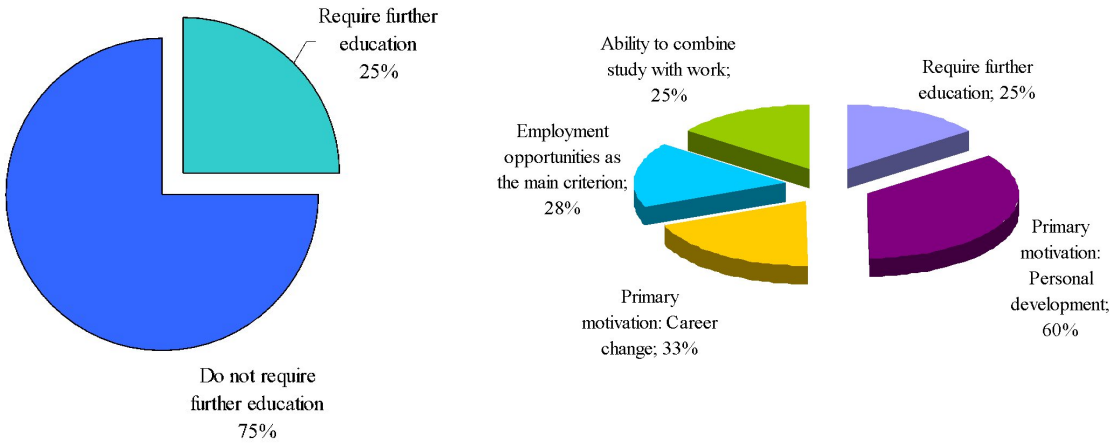


Fig. 2. Veterans' Need for Further Education after Military Service

In itself, this indicator does not measure the overall level of veterans' interest in education. Rather, it identifies the proportion of respondents who, at the time of the survey, regarded further education as a necessary condition for their subsequent professional development.

These findings have important implications for the design of veterans' vocational education. Since only a proportion of veterans require comprehensive retraining, standardised educational programmes are unlikely to address the diversity of learners' needs. A more effective approach is to develop a multi-level system combining long-term vocational programmes with short courses, micro-credentials, competency-based modules and flexible learning pathways. Such an approach is particularly relevant for the tourism and hospitality sector, where occupations require different combinations of professional, digital, managerial and interpersonal competencies.

Table 1

Veterans' Educational Needs after Military Service (n = 240)

Indicator	Percentage	Educational implication
Require further education	25%	Demand for structured vocational programmes
Primary motivation: Personal development	60%	Need for flexible and self-paced learning
Primary motivation: Career change	33%	Demand for vocational retraining
Employment opportunities as the main criterion	28%	Priority for practice-oriented education
Ability to combine study with work	25%	Need for flexible delivery formats

The response patterns presented in Table 1 indicate that veterans' educational demand extends beyond vocational retraining alone. Alongside the acquisition of new professional qualifications, respondents emphasised personal development, employment-oriented learning and flexible study arrangements. These priorities reflect the diversity of veterans' career trajectories and professional backgrounds, indicating that vocational education should provide multiple learning pathways rather than a single standardised model.

Responding to these educational priorities requires instructional approaches that combine flexibility with practical relevance. Technology-enhanced learning enables personalised educational pathways, competency-based instruction and closer alignment between learning activities and workplace requirements. In the tourism and hospitality sector, where professional competence is developed through authentic practice and interaction, digital technologies support experiential learning while improving access to education for learners with different educational needs.

Table 2 summarises the relationship between the identified educational needs and technology-supported educational responses [22], [23].

The relationships presented in Table 2 were established through analytical synthesis of three sources of evidence:

1) The empirical findings of the nationwide survey of veterans regarding their educational priorities and preferred learning conditions;
2) The results of competency mapping that linked these needs to sector-specific professional requirements;
3) The documented pedagogical affordances of interactive digital learning technologies reported in the contemporary literature.

The table therefore reflects an evidence-informed correspondence between veterans' expressed educational needs and technology-supported instructional responses rather than a purely theoretical construction.

Table 2

Technology-Based Responses to Veterans' Educational Needs in Tourism and Hospitality

Educational need	Supporting evidence	Technology-supported response	Expected outcome
Practical employability	Employment is the main programme selection criterion (28%)	Simulation-based learning and industry case studies	Improved job readiness
Flexible learning	25% need to combine study with work	Blended learning and mobile LMS access	Greater learning flexibility
Career transition	33% seek a new profession	Digital vocational retraining modules	Faster career adaptation
Personal development	60% pursue self-development	Modular online courses and microlearning	Continuous competence development
Social reintegration	Identified in the literature	Collaborative online learning activities	Enhanced social integration

The analysis indicates that the principal challenge in veterans' vocational education is not expanding the number of educational programmes but adapting them to diverse career pathways and labour market requirements. Employers increasingly prioritise practical competence, teamwork, adaptability, problem-solving and independent decision-making over theoretical knowledge alone. This shift is particularly significant in tourism and hospitality, where professional competence is acquired primarily through practice. Effective guest communication, service organisation, conflict management and quality assurance require experiential learning that cannot be fully developed through traditional lecture-based instruction.

These requirements are reinforced by the characteristics of the veteran population. Most veterans enter vocational education with substantial professional and life experience, making adult learning principles essential to curriculum design. Educational programmes should therefore emphasise active participation, problem-based learning, practical relevance and the immediate application of knowledge. Interactive digital learning technologies support these objectives by integrating veterans' previous experience into competency development while facilitating successful professional transition to the tourism and hospitality industry.

3.2. Competency Mapping for Vocational Training

A central contribution of this study is the systematic application of competency mapping to align veterans' educational needs with the professional demands of the tourism and

hospitality industry. Rather than treating educational demand and labour market requirements as separate domains, the mapping process provided a rigorous analytical bridge, transforming raw survey data into clearly defined, sector-relevant competencies. This approach enabled a more precise identification of both competency gaps and transferable military skills, offering a sound foundation for curriculum development (Figure 3).

Veterans possess a distinctive profile of transferable competencies developed through military service, including discipline, responsibility, teamwork under pressure, logistical planning, risk assessment and decision-making in uncertain and dynamic environments. Competency mapping revealed that these attributes hold considerable value in the tourism and hospitality industry, particularly in areas such as operational coordination, crisis management, team leadership, and maintaining service standards during peak periods. However, the mapping process also highlighted important areas requiring targeted development, most notably customer orientation, digital competence, personalised service delivery and cultural adaptability, skills that are increasingly essential in a sector undergoing rapid digital transformation and rising guest expectations.

It would be misleading to assume that successful reintegration always demands a complete change of professional identity. On the contrary, the findings support a more productive strategy: building upon veterans' existing strengths while systematically addressing sector-specific gaps. Digital competence emerges as particularly critical. Modern tourism operations rely heavily on property management systems, online reservation platforms, customer relationship management (CRM) tools, and data analytics. Veterans who lack confidence in these areas risk being disadvantaged, regardless of their other professional qualities.

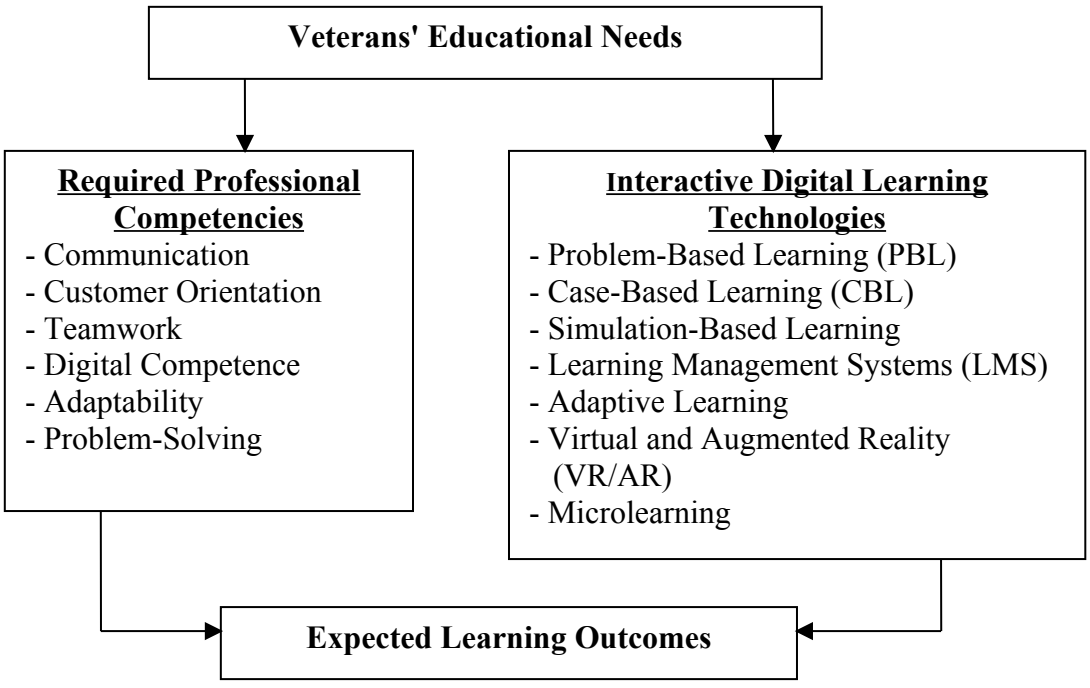


Fig. 3. Competency Mapping Framework

Thus, competency mapping served not merely as an analytical tool but as a strategic mechanism for designing vocational programmes that respect prior military experience while ensuring alignment with contemporary industry needs. On this basis, the main dimensions of curriculum design for veterans' professional preparation are synthesised in Table 3.

Table 3 summarises the principal dimensions of the proposed conceptual model. The

relationships between prior military experience, labour market requirements, flexible learning pathways, digital transformation and professional transition were derived from the competency mapping procedure and the subsequent analytical synthesis. Each dimension represents an analytically justified link between empirical evidence on veterans' educational needs, transferable military competencies and the structural requirements of competency-based vocational education for the tourism and hospitality industry.

Table 3

Conceptual Model for Veterans' Professional Preparation for Employment in Tourism and Hospitality

Dimension	Educational implications	Curriculum design priorities
Prior military experience	Recognition of transferable competencies acquired through military service	Competency-based curricula incorporating recognition of prior learning
Labour market requirements	Alignment of learning outcomes with current workforce needs	Practice-oriented modules developed in partnership with industry
Flexible learning pathways	Accommodation of diverse educational backgrounds and career trajectories	Modular programmes, micro-credentials and flexible modes of study
Digital transformation	Integration of digital competencies into vocational education	Training in property management systems, reservation platforms, CRM systems and digital communication tools
Professional transition	Adaptation from military service to customer-oriented professional environments	Interactive learning, workplace-based learning and experiential activities

The framework demonstrates that successful vocational preparation depends on the integration of several interrelated dimensions rather than on curriculum content alone. Recognition of transferable competencies, responsiveness to labour market demand, flexible programme structures and practice-oriented learning collectively provide the foundation for effective professional reintegration.

For veterans, this approach offers an additional advantage. It recognises the value of competencies already acquired through military service and avoids requiring individuals to begin their professional development from the outset. Education thus serves primarily to complement and adapt existing competencies to the requirements of the civilian labour market. In the context of Ukraine's post-war recovery, such a model appears particularly well suited to supporting the sustainable development of the tourism and hospitality sector while facilitating the effective professional reintegration of veterans.

3.3. Pedagogical Potential of Interactive Digital Learning Technologies

The analysis of veterans' educational needs demonstrates that vocational education should not be limited to knowledge acquisition but should create conditions for the systematic development of professional competencies required for sustainable employment. Within the tourism and hospitality industry, successful professional performance depends on the ability to communicate effectively, collaborate in multidisciplinary teams, solve operational problems and adapt to rapidly changing service environments [24].

Interactive digital learning technologies provide an appropriate educational environment for competency development because they promote active participation, reflection and evidence-informed decision-making. Unlike traditional instructional approaches centred on information transfer, interactive learning requires learners to analyse professional situations, justify decisions, evaluate alternative solutions and reflect on the outcomes of their actions. Such learning is consistent with the competency profile identified through the analysis of

veterans' educational needs and reflects the operational realities of tourism and hospitality, where professional judgement and customer-oriented decision-making are integral components of everyday practice [25], [26].

Problem-Based Learning represents one of the most appropriate approaches for strengthening analytical reasoning and professional judgement within competency-based vocational education. Learning activities organised around authentic professional problems encourage learners to identify relevant information, assess possible courses of action and develop justified solutions. In tourism and hospitality education, these problems may relate to service recovery, operational coordination, customer communication or unexpected organisational challenges. For veterans, such learning creates opportunities to transfer competencies developed during military service, including responsibility, structured decision-making and adaptability to civilian professional contexts while supporting the acquisition of sector-specific knowledge [8], [9].

Case-Based Learning and Simulation-Based Learning complement this process by providing structured opportunities to examine authentic professional situations and practise workplace activities in a safe educational environment. Case analysis develops evidence-informed professional judgement through the interpretation of managerial decisions and organisational practices, whereas simulation enables repeated practice of operational tasks before entering real workplaces. Together, these approaches strengthen communication, teamwork and procedural confidence while reducing the gap between educational preparation and professional performance [20].

Scenario-Based Learning further extends competency development by requiring learners to evaluate complex professional situations in which multiple solutions may be appropriate depending on organisational priorities, customer expectations and available resources. This approach encourages strategic thinking, collaborative decision-making and adaptive problem-solving, competencies that are particularly relevant for service-oriented professions characterised by dynamic and often unpredictable operating conditions. Considered collectively, problem-based, case-based, simulation-based and scenario-based learning establish a coherent pedagogical foundation for competency-based vocational education and create favourable conditions for veterans' successful transition into employment within the tourism and hospitality industry [27].

Interactive digital learning technologies extend learning beyond the classroom and provide continuous access to educational resources, communication and formative feedback. For veterans, whose participation in education is often influenced by employment, rehabilitation or family responsibilities, flexible access to learning becomes an important prerequisite for sustained engagement and successful programme completion. Within competency-based vocational education, these technologies therefore function not only as information delivery tools but also as mechanisms that support personalised learning trajectories and continuous competency development [7].

Learning Management Systems (LMS) provide the organisational framework for coordinating educational activities, monitoring learner progress and facilitating interaction between instructors and participants. Their educational value extends beyond the management of learning materials by enabling structured communication, collaborative assignments and timely formative assessment. In vocational education for tourism and hospitality, LMS platforms support the integration of theoretical instruction with practical tasks, allowing learners to revisit educational resources, complete competency-oriented activities and receive feedback throughout the learning process [6].

Adaptive learning technologies further strengthen personalised education by adjusting learning pathways to individual progress, prior knowledge and competency development. Rather than requiring all participants to follow an identical sequence of instructional activities,

adaptive systems enable learners to focus on competencies requiring additional development while progressing more efficiently through familiar material. Such flexibility is particularly valuable in veterans' education, where previous professional experience, educational backgrounds and learning needs may differ substantially across participants.

Microlearning and the flipped classroom provide additional opportunities to increase flexibility and learner engagement. Short, focused learning units facilitate the gradual acquisition of professional knowledge and can be integrated into daily routines without requiring prolonged periods of uninterrupted study. The flipped classroom complements this approach by transferring introductory theoretical learning to the online environment and reserving classroom time for discussion, collaborative problem-solving and the application of knowledge through authentic professional tasks. This organisation of learning increases opportunities for active participation while strengthening the connection between theoretical preparation and practical competency development.

Taken together, these technologies enhance the educational potential of interactive pedagogies by providing flexible access, personalised learning pathways and continuous instructional support. Their contribution lies not in replacing face-to-face learning but in creating integrated educational environments in which theoretical knowledge, practical activities and competency assessment are combined within a coherent vocational education process. Such an approach increases the accessibility, adaptability and educational effectiveness of programmes designed to prepare veterans for employment in the tourism and hospitality industry [28].

Immersive and visual learning technologies further expand the opportunities for competency-based vocational education by reproducing professional environments that cannot always be experienced during conventional classroom instruction. Their educational contribution lies in creating authentic learning contexts in which learners can observe, analyse and practise professional activities before entering real workplaces. Within tourism and hospitality education, these technologies strengthen the connection between theoretical preparation and practical performance while reducing the risks associated with workplace training.

Virtual Reality (VR) enables learners to participate in realistic professional situations requiring immediate decision-making and effective communication. Virtual hotel reception, guest interaction, emergency response and service recovery scenarios allow learners to develop professional judgement and operational confidence through repeated practice in controlled educational settings. Such experiences support competency development by encouraging learners to apply knowledge under conditions that closely resemble professional practice while providing opportunities for reflection and continuous improvement [29].

Augmented Reality (AR) complements this process by integrating digital information into real learning environments. Rather than replacing practical training, AR enriches workplace-based learning through interactive guidance, contextual information and immediate instructional support. Within tourism and hospitality education, this technology may assist learners in mastering operational procedures, understanding equipment, navigating service environments and performing practical tasks more independently, thereby strengthening both technical competence and learner confidence [29].

A further category of interactive technologies comprises 360-degree virtual tours**.** Within tourism education, their value extends far beyond promotional purposes. Interactive exploration of hotels, museums, tourist attractions, conference centres and cultural heritage sites enables learners to examine spatial organisation, assess the accessibility of infrastructure, evaluate visitor navigation systems and analyse the movement of tourist flows. The use of these resources supports the development of spatial reasoning, an essential competency for tour guides, tourism managers, hotel administrators and destination management professionals.

Geographic Information Systems (GIS) represent an important component of digital vocational education in tourism and hospitality by enabling learners to analyse spatial information and support evidence-informed decision-making. These technologies allow future professionals to evaluate tourism resources, accommodation and food service facilities, assess destination accessibility and design travel itineraries using spatial analysis [30].

Digital mapping applications such as ArcGIS StoryMaps and Google My Maps combine cartographic data with photographs, videos and textual information within an interactive environment, providing authentic learning experiences that strengthen digital competence, spatial awareness and analytical thinking. Interactive multimedia resources, virtual field visits and destination visualisations further extend learning beyond the traditional classroom by enabling students to explore tourism destinations, analyse visitor flows and evaluate service infrastructure through realistic digital representations.

LMS, particularly Moodle and Canvas, provide the digital infrastructure necessary for organising competency-based vocational education. Beyond serving as repositories for educational materials, these platforms integrate case studies, simulations, online assessments, discussion forums, electronic portfolios and communication tools within a unified learning environment. Their functionality supports personalised learning pathways, continuous formative assessment and systematic monitoring of learner progress while enabling repeated engagement with complex topics and timely feedback from instructors.

The analysis demonstrates that the educational effectiveness of interactive digital learning technologies depends not on the isolated application of individual instructional methods but on their pedagogically justified integration within competency-based vocational education. These technologies develop professional judgement through active learning; ensure flexibility and continuous learner support, while immersive technologies provide authentic professional experiences that strengthen practical competency development. Their complementary application creates coherent educational pathways capable of responding to veterans' educational needs and the competency requirements of the tourism and hospitality industry. This integrated perspective is summarised (in Table 4) [6], [9], [20].

The associations presented in Table 4 constitute the core of the proposed conceptual model. They were established by systematically matching the competency gaps and transferable strengths identified through competency mapping with the specific pedagogical contributions of interactive digital learning technologies. The selection of technologies and the expected outcomes for professional reintegration are therefore grounded in the combined evidence of survey data, competency analysis and the pedagogical literature, forming an evidence-informed framework for curriculum design.

Table 4

Conceptual Model of Interactive Digital Learning Technologies for Veterans' Professional Reintegration

Educational objective	Interactive digital learning technologies	Pedagogical contribution	Expected outcome for professional reintegration
Developing professional judgement	Problem-Based Learning, Scenario-Based Learning	Strengthens analytical reasoning and decision-making in complex situations	Greater readiness to address operational challenges
Building occupation-specific competence	Simulation-Based Learning, Virtual Reality, Augmented Reality	Provides repeated practice in authentic professional contexts	Faster adaptation to workplace requirements
Enhancing analytical capability	Case-Based Learning	Develops evidence-informed analysis and reflective problem-solving	Improved service quality and professional performance
Supporting individual	Learning Management	Enables flexible	Continuous competency

learning pathways	Systems, Adaptive Learning, Microlearning	progression according to individual learning needs	development and lifelong learning
Promoting collaborative practice	Flipped Classroom and collaborative interactive digital learning technologies	Encourages communication, teamwork and active participation	More effective integration into multidisciplinary service teams

The proposed model highlights the complementary nature of interactive digital learning technologies. Each approach addresses a distinct aspect of competency development while contributing to a broader educational environment that supports professional transition. Their combined application enables vocational programmes to accommodate diverse learning needs, reinforce practical capability and strengthen graduates' preparedness for employment in the tourism and hospitality industry.

The analysis of contemporary interactive technologies indicates that their educational effectiveness depends less on technological sophistication than on their capacity to engage learners actively in professional practice before they enter the workplace. This consideration is particularly significant for veterans because professional reintegration involves not only acquiring new knowledge but also developing confidence in their ability to succeed within a new occupational environment. Consequently, the greatest educational benefits are achieved through the integration of Problem-Based Learning**,** Case-Based Learning and Simulation-Based Learning with digital interactive technologies that replicate, as closely as possible, the operational conditions of contemporary tourism and hospitality enterprises.

An important implication arising from the analysis is that the educational value of interactive digital learning technologies depends primarily on their pedagogical alignment with competency requirements rather than on the technologies themselves. The selection of instructional approaches should therefore be guided by the competencies expected within specific professional roles in tourism and hospitality. Under these conditions, digital technologies become an integral component of competency-oriented curriculum design rather than independent educational innovations.

The analysis further indicates that veterans' vocational education should build upon competencies developed during military service instead of treating professional retraining as the acquisition of an entirely new occupational identity. Leadership, responsibility, teamwork and decision-making under pressure represent valuable educational resources that can be adapted to customer-oriented professional environments through authentic learning activities, continuous feedback and practice-based instruction. Such an approach not only increases educational relevance but also supports a more confident transition into civilian employment.

The combination of competency-based curriculum design with interactive digital learning technologies also strengthens the responsiveness of vocational education to changing labour market conditions. Flexible learning pathways, personalised digital environments, and practice-oriented instructional methods enable educational programmes to accommodate diverse learning trajectories while maintaining common professional standards. For the tourism and hospitality industry, where workplace performance depends upon the simultaneous application of interpersonal, organisational and digital competencies, this integrated educational approach provides a more sustainable basis for professional preparation than traditional content-centred instruction.

Unlike previous studies that examined educational technologies or veterans' reintegration separately, the proposed evidence-informed conceptual model integrates competency mapping, veterans' educational needs, transferable competencies and labour market competency requirements within a single pedagogical framework for vocational education.

4. CONCLUSIONS

The study examined the educational needs of Ukrainian veterans in relation to the competency requirements of the tourism and hospitality industry and assessed the pedagogical potential of interactive digital learning technologies for supporting vocational preparation. On the basis of secondary analysis of nationally representative survey data, competency mapping and a systematic review of contemporary literature, an evidence-informed conceptual model was developed and theoretically substantiated.

The principal scientific contribution of the study lies in the systematic integration of four interrelated elements that have previously been examined largely in isolation: veterans' educational needs, military-acquired competencies, labour market requirements of the tourism and hospitality industry, and the pedagogical affordances of interactive digital learning technologies. Competency mapping revealed that military service develops a range of transferable competencies, including discipline, responsibility, and teamwork under pressure, logistical planning, risk assessment and decision-making in dynamic conditions that hold substantial value for the industry. At the same time, critical competency gaps were identified, particularly in customer orientation, digital competence, personalised service delivery and cultural adaptability.

The proposed conceptual model establishes clear pedagogical relationships between these elements and demonstrates how interactive digital learning technologies (Problem-Based Learning, Case-Based Learning, Simulation-Based Learning, Scenario-Based Learning, microlearning, the flipped classroom, Learning Management Systems, adaptive learning, Virtual Reality, Augmented Reality and Geographic Information Systems) can be purposefully applied to recognise prior military experience, address identified gaps and support veterans' professional transition. Rather than treating professional retraining as the acquisition of an entirely new occupational identity, the model positions education as a process of adapting and complementing existing competencies to the requirements of customer-oriented professional environments.

The findings indicate that the educational effectiveness of interactive digital learning technologies depends primarily on their pedagogical alignment with competency requirements rather than on technological sophistication alone. When integrated within a coherent competency-based framework, these technologies facilitate personalised learning pathways, strengthen the practical orientation of vocational education and enhance veterans' readiness for employment in the tourism and hospitality industry.

The proposed conceptual model may support higher education institutions, vocational education providers and public authorities in designing educational programmes that simultaneously respond to veterans' diverse educational needs, labour market demands and the continuing digital transformation of the sector. In this respect, the study contributes to the development of technology-enhanced vocational education within the context of Ukraine's post-war recovery.

Future research should focus on the empirical validation of the proposed conceptual model within real-world vocational education programmes. Particular attention should be given to evaluating its effectiveness in supporting competency development, learning outcomes and subsequent labour market reintegration of veterans.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

No generative AI or AI-assisted technologies were used in the preparation or writing of this manuscript.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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ЗАСТОСУВАННЯ ІНТЕРАКТИВНИХ ЦИФРОВИХ ТЕХНОЛОГІЙ НАВЧАННЯ У ПРОФЕСІЙНІЙ ПІДГОТОВЦІ ВЕТЕРАНІВ ДЛЯ ІНДУСТРІЇ ТУРИЗМУ ТА ГОСТИННОСТІ

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Анотація. Професійна реінтеграція ветеранів належить до пріоритетних завдань повоєнного відновлення України та актуалізує необхідність розвитку сисмютеми освіти, орієнтованої на потреби сучасного ринку праці й різноманітні освітні запити ветеранів. Індустрія туризму та гостинності створює значні можливості для працевлаштування, проте перехід до цивільної професійної діяльності потребує галузевих знань, цифрових компетентностей, комунікативних навичок, здатності працювати в команді, ухвалювати рішення та адаптуватися до сервісного середовища.
Метою дослідження є розроблення та теоретичне обґрунтування концептуальної моделі інтеграції інтерактивних цифрових технологій навчання у професійну підготовку ветеранів для працевлаштування в індустрії туризму та гостинності. Методологія дослідження поєднує вторинний аналіз результатів загальнонаціонального соціологічного опитування,

проведеного Українським ветеранським фондом спільно з Соціологічною групою «Рейтинг» у грудні 2025 року за участю 240 респондентів, картування компетентностей та систематичний огляд наукових публікацій.
Картування визначило компетентності, набуті під час військової служби, які можуть бути застосовані в цивільній професійній діяльності, зокрема дисципліну, командну роботу в умовах підвищеного навантаження, логістичне планування та ухвалення рішень у динамічних ситуаціях. Водночас виявлено прогалини у клієнтоорієнтованості, цифровій грамотності та персоналізованому обслуговуванні. На цій основі розроблено модель, що поєднує освітні потреби ветеранів, набуті компетентності, вимоги ринку праці та інтерактивні технології, зокрема проблемне, кейс-орієнтоване, симуляційне й сценарне навчання, мікронавчання, flipped classroom, адаптивне навчання, Virtual Reality, Augmented Reality та Geographic Information Systems. Модель може застосовуватись у професійній підготовці ветеранів для підвищення їхньої конкурентоспроможності та сприяння професійній і соціальній реінтеграції. Подальші дослідження мають передбачати її емпіричну апробацію в реальних освітніх програмах.

Ключові слова: ветерани; професійна освіта; індустрія туризму та гостинності; інтерактивні цифрові технології навчання; картування компетентностей; професійна реінтеграція.

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