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Evaluation of a Digital Geography Textbook by Secondary School Students in Slovakia through the Expectation Confirmation Model

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Geography is among the scientific disciplines with a subject of study that dynamically changes across space and time. This characteristic necessitates the continuous updating of educational materials in terms of content. At the same time, contemporary developments offer expanded possibilities for their creation, primarily through digital technologies. Geography teaching materials in the twenty-first century should reflect the topicality of the content, stimulate student engagement, and effectively convey geographical knowledge, with particular emphasis on the integration of multimedia elements. The focus of this study is on online digital teaching materials entitled *Current Issues of Europe*. The aim of the article is to analyze and evaluate their pedagogical effectiveness from the perspective of secondary school students in Slovakia, with a focus on their perceptions of the quality, relevance, and usability of these materials in geography education. This evaluation was conducted using the expectation confirmation model, which is based on the technology acceptance model. The questionnaire was the main data collection tool from a sample of 203 students at secondary schools. The results showed that expectation positively affects perceived playfulness and usefulness in digital-textbook-integrated classes. The hypotheses related to satisfaction and the continuance intention to use digital textbooks were not confirmed, however. **Key Words:** digital textbook, evaluation, expectation confirmation model, geography.

Geography teachers must be aware and understand rapidly changing landscapes in the Anthropocene to keep geography education relevant (Chang and Kidman 2024). For students, the fundamental source of information remains the textbook; however, its content becomes outdated and no longer current after just a few years (Esteves 2019). For this reason, as well, the authority attributed to textbooks as the sole source of knowledge in the classroom has diminished (Roldán Vera 2018), as they are increasingly becoming just one of many available educational resources (UNESCO 2014). Teachers must keep pace with this trend and introduce innovations into their teaching in various forms, aiming to enrich and make instruction more engaging, while also enhancing the motivation of all participants in the educational process (Roldán Vera 2018). Although teachers are open to educational innovation, they are limited by several factors, including the scarcity of available materials and insufficient support from state authorities and educational institutions in the development of teaching resources (Karolčík and Marková 2025).

Didactic research highlights the features of a modern geography textbook, emphasizing relevant case studies, alignment with national curricula, and geographical balance (Lee and Catling 2017). Writing materials should consider educational objectives, curricular content, and the authors' pedagogical and graphic design expertise. Modern textbooks should foster geographic skills (Maryani

2021). Accelerated by the COVID-19 pandemic, digital learning environments and textbooks have flourished as sustainable alternatives to costly printed materials (Osih and Singh 2020; Chavali and Gundala 2022; Lim et al. 2022). Open educational resources (OER) offer a free, accessible solution, providing diverse materials from courses to multimedia content (D'Antoni 2009; Hilton 2016). By hybridizing text with interactive elements like maps and virtual reality, digital textbooks enhance student engagement and individualized learning (Hilander 2023). To prevent information overload and distraction, however, a careful balance between text and media is essential (Yessenbekova et al. 2025).

In geography, where the creation and interpretation of visual imagery have always played a central role, such resources are particularly valuable (Thornes 2004). Virtual tours, field trips, online globes, thematic maps, and spatiotemporal comparison tools—alongside traditional media (images, videos, graphs, tables)—are indispensable visualization aids in geography instruction (McDaniel 2022). These tools can encourage students to study geography and deepen their understanding by being integrated into the learning process (Ghafar et al. 2023).

A digital textbook should provide a user-friendly environment. It could also incorporate additional resources, tasks, glossaries, and opportunities for personalized, advanced learning through self-assessment functions (Fouh et al. 2014). Content should be easily reconstructable, extractable, and linkable to

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external materials (Lim et al. 2022). Interactive textbooks are valuable, as their hypertext architecture mirrors the brain's semantic networks, supporting meaningful learning (Mayer 2010).

Numerous studies demonstrate that such materials can enhance students' comprehension and engagement in geography (Ghfar et al. 2023; Hilander 2023) and related disciplines. Digital educational materials should be fully responsive (Sebillo et al. 2020) and accessible across all devices to support anytime and anywhere learning in line with the increasing use of mobile devices (Iqbal and Bhatti 2020; Tazhenova, Mikhaylova, and Turgunbayeva 2024).

The integration of technology into education has become a necessity in the digital era. A mobile digital textbook built on the science, technology, engineering, and mathematics (STEM) paradigm emerges as an invaluable tool for sophisticated pedagogy in geography. Although STEM can be implemented within a single discipline, it is increasingly applied in an interdisciplinary manner to support students' understanding of relationships between phenomena and their real-world applications (Putra et al. 2023). This study adopts STEM primarily as an interdisciplinary framework. Despite the significant expansion of digital tools and geomedial in geography education, systematic research examining students' perceptions and acceptance of these resources remains limited. This study addresses this gap by analyzing secondary school students' evaluations of the digital textbook *Current Issues of Europe*, thereby contributing to a deeper understanding of how digital materials are received and what factors influence their effectiveness in geography instruction. Data-driven didactic research (van Geel et al. 2016; Schildkamp 2019) can support improvements in teaching, in the quality of didactic materials and aids, and consequently in students' learning outcomes. Student feedback is a key component in the implementation of educational innovations (Noell et al. 2002) and an essential tool for the continuous enhancement of teaching practices (Cook-Sather 2007).

Materials and Methods

Materials

This study presents an online digital textbook of regional geography for Slovak secondary schools, covering fifteen European issues identified via teacher and student surveys (Škodová, Madleňák, and Damek 2022). Aligning content with student interests could improve learning outcomes (Kidman 2018). The freely accessible educational Web site www.aktualneproblemyeuropy.sk follows Behnke's

(2021) visual design principles to enhance motivation and knowledge acquisition (Figure 1, Table 1).

The home page of the digital textbook consists of a short description and a table of contents (Figure 1). Chapters are represented by introductory images illustrating the given topic. Another tab provides a more detailed description of the textbook, including instructions for its use.

For the development of predominantly geography-oriented content, we used the StoryMaps platform by Esri, which is a leading company in geospatial mapping and geographic information system (GIS) technology and offers great potential in education (Vojteková and Vojtek 2024). StoryMaps enables the design and organization of dynamic, interactive teaching materials that integrate diverse visual and geospatial elements (Cope et al. 2018; Agustinah et al. 2023). Avoiding reliance on a single media type is recommended (Xiao et al. 2020), as a balanced combination of geomedial can enhance teaching effectiveness and students' understanding, particularly in map-based geography education (Pakniy and Rakusa 2024; Nuryadin, Utaya, and Astina 2025). In this project, multiple forms of geomedial were combined (Figure 2).

The main textual section was complemented by supplementary case study material, visually distinguished from the core text. Each chapter concludes with a set of tasks derived from the geomedial used. Research has shown that students often struggle with decoding visual information (Van Meter et al. 2020). Therefore, the careful selection of supplementary visual content is crucial for the successful development of students' geographical knowledge and visual literacy skills (Eitel et al. 2013; Ballstaedt 2017).

Measurement Instruments

The digital learning materials were evaluated using the expectation confirmation model (Bhattacharjee 2001; Joo, Park, and Shin 2017), which is derived from the technology acceptance model. This model is commonly employed in research to examine the acceptance of new electronic technologies or services (Davis 1989; Davis and Venkatesh 1996). The questions were structured, in line with the methodology, into five main content categories, each comprising three items (Table 2). Respondents were asked to indicate their level of agreement with each statement on a five-point Likert scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*).

In this method, expectation refers to the extent to which users' anticipations are met based on their experience with the technology; perceived usefulness is the degree to which users believe that using the technology is beneficial; satisfaction is the positive emotional state resulting from the evaluation of technology use; and continuance intention refers to

Homepage of the website

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Úvod

Európa v súčasnosti prechádza veľkým dynamickým spoločenským vývojom. Jednotlivé krajiny, regióny a ich obyvateľia sú konfrontovaní s mnohými výzvami súvisiacimi napr. s klimatickou zmenou, starom, životného prostredia, starnutím obyvateľov, vyľudňovaním periférnych regiónov, transformáciou priemyselných odvetví, ilegálnou migráciou, nárastom politického extrémizmu či vojnou na Ukrajine. Mnohé z týchto problémov, či dokonca kríz, sa netýkajú len Európy, majú globálny charakter. Sú to pomere zložité a komplexné problémy, vzájomne prepojené v rôznych súvislostiach. O väčšine z nich sa intenzívne diskutuje, pričom na ich riešenie existujú rôzne názory a postoje. Ak chce spoločnosť tieto výzvy zvládnuť, potrebuje ich čo najlepšie poznať. Keďže, že k tomu prispieja aj médiá, ktoré s nimi pripravujú a vyjadrujú názory. Sú určité pre súčasných, čitateľov, ale aj širokú verejnosť, ktorá sa o tieto problémy zaujíma.

KLÍMA SA MENÍ, MENÍME SA TIEŽ?

PRÍRODNÉ ZDROJE A ENERGETIKA

ZDROJE SLADKEJ VODY

POUNOHOŠPODÁRSKEJ PÓDY

UBÚDANIE

Instructions

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O projekte

Pod úvodným obrázkom na začiatku učebného materiálu sa nachádza obsah s jednotlivými obrázkami. Po kliknutí na názov podkapitoly sa automaticky presuniete k príslušajúcemu textu.

14. Čo je migrácia a aké má podoby? Prečo ľudia opúšťajú domov? Mnohokrát kríz v Európe - aké boli príčiny a aké sú dôsledky? Ako vznikala Európa a Slovensko migráciou ľudí?

Chapters

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Kapitoly

Klíma sa mení, meníme sa tiež??

Prírodné zdroje a energetika	Zdroje sladkej vody	Úbúdanie poľnohospodárskej pôdy	Životné prostredie	Kvalita života	Starostlivosť Európa	Mestá v minulosti a súčasnosti	Výsklady spracovania prírodných zdrojov	Transformácia priemyselných regiónov	Masový cestovný ruch	Vojna na Ukrajine	Demokratické alebo
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KLÍMA SA MENÍ, MENÍME SA TIEŽ?

PRÍRODNÉ ZDROJE A ENERGETIKA

ZDROJE SLADKEJ VODY

ÚBÚDANIE POĽNOHOSPODÁRSKEJ PÓDY

Atlas of current issues of Europe

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Atlas

Atlas aktuálnych dôležitých udalostí v Európe

december 2013 - Eurohájdan

február 2014 - Obdobie Krimy

september 2014 - Dvadsať a Lufthansa

2015 - Migrácia ľudí v Európe

Figure 1 Web site of digital textbook Actual Issues of Europe.

Table 1 *Design qualities of visual elements in textbooks by Behnke (2017)*

Design quality	How was it applied in the textbook?
Aesthetics (visual appeal)	The Web site uses a simple, minimalist design.
Orientation (quick and easy)	The interface is user-friendly, with a simple main menu located at the top of the screen.
Usefulness (relevant information complementing text)	Each chapter consists of a main text, supplementary case study material, and geomeia content.
Helpfulness (support for tasks and comprehension)	Each chapter ends with exercises and a short self-assessment quiz based on the text, maps, or other geomeia, which research shows enhances learning more effectively than isolated text or images (Eitel et al. 2013).
Interest (relevant content, new perspectives)	Short reflection questions are embedded in the text to capture students' attention and guide them into the following section.
Comprehensibility (images linked to the topic)	The text is enriched with relevant geomeia resources (images, videos, maps, infographics, tables, graphs, animations, etc.). While scrolling through the text, related media appear automatically alongside the relevant content.

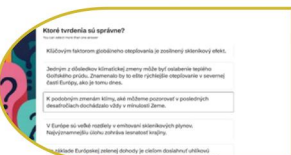
	Images	- used from reliable sources with proper citation; some served purely as visual background elements and were drawn from Un-splash. In some cases, images were inserted as galleries;
	Videos	- embedded from YouTube when directly related to the topic. Some background videos were included from freely available databases such as Coverr, Unsplash, or Pexels;
	Maps	- thematic maps (e.g., choropleth maps) and express maps were created directly in StoryMaps, based on statistics from trusted sources (e.g., Eurostat, World Bank Open Data). Ready-to-use maps from the Living Atlas of the World were incorporated as well;
	Side panel	- the side panel layout allowed the main text on one side of the screen to be displayed along-side visual content on the other;
	Embedded elements	- external interactive resources embedded via iframes (e.g., a virtual map from Climate Central illustrating flood-prone areas). Using this function, interactive modules from the Genially platform (e.g. self-assessment tests) were also integrated;
	Comparison tool	- enabled side-by-side comparison of two media items (e.g., images, maps) across different time periods using a slider function.

Figure 2 *Geomeia content in Actual Issues of Europe digital textbook.*

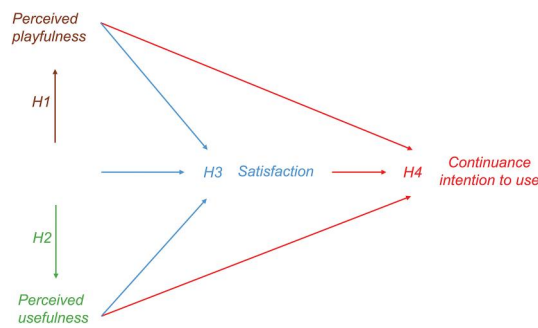
the intention to continue using the service (Bhattacharjee 2001). If expectations are met, users tend to be satisfied and perceive the technology as useful, and they are more likely to continue its use over time (Bhattacharjee 2001; Joo, Park, and Shin 2017).

Data Collection and Analysis Procedure

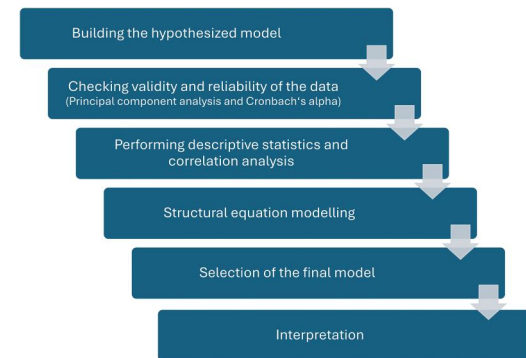
The questionnaire was distributed electronically to several secondary schools in Slovakia through geography teachers, who introduced the digital textbook to their students. The students were asked to review, read, and study the textbook at home, with a one-

Table 2 Questionnaire items related to the expectation confirmation model methodology

Expectation	E1	My experience with using the digital textbook was better than I had expected.
	E2	In the digital textbook, I learned much more new information about current issues in Europe than I had expected.
Perceived usefulness	E3	This type of textbook interested me significantly more than a traditional printed textbook.
	PU1	The digital textbook is a source of up-to-date geographical information about Europe.
	PU2	Using the digital textbook about Europe was useful for me.
Perceived playfulness	PU3	From the digital textbook, I learned not only about the geography of Europe but also many new and interesting insights from other fields.
	PP1	While working with the textbook, I felt very relaxed.
	PP2	The interactive maps, images, videos, and animations in the digital textbook captured my attention.
Satisfaction	PP3	Studying new information about Europe in this digital textbook was enjoyable for me.
	S1	I am satisfied with the content and topics covered in the digital textbook.
	S2	The tasks and the test at the end of each topic are interesting and engaging.
Continuance intention	S3	I am satisfied with the use, navigation, and features of the digital textbook.
	CI1	I intend to continue using the digital textbook for studying geography.
	CI2	I intend to continue using the digital textbook for studying other subjects as well as in my free time.
	CI3	I would recommend this digital textbook to my classmates and acquaintances.


Figure 3 Hypothesized model.

- **H2:** Expectation will positively affect perceived usefulness in digital-textbook-integrated classes.
- **H3:** Expectation, perceived playfulness, and perceived usefulness will positively affect satisfaction in digital-textbook-integrated classes.
- **H4:** Expectation, perceived playfulness, and perceived usefulness will positively affect continuance intention to use digital textbooks in digital-textbook-integrated classes.


Figure 4 Summary of the procedure and methods used to build the expectation confirmation model.

month timeframe for this activity. Feedback was received from 203 students.

With respect to the original study (Joo, Park, and Shin 2017), the following four hypotheses were established (Figure 3):

- **H1:** Expectation will positively affect perceived playfulness in digital-textbook-integrated classes.

The analysis was performed in RStudio (Posit Team 2025) using the R programming language (R Core Team 2025). Questionnaire validity was verified using principal component analysis (PCA; Abdi and Williams 2010), and internal consistency was assessed with Cronbach's alpha (Cronbach 1951). Descriptive statistics and a correlation analysis were performed. Due to ordinal, nonnormal data, diagonally weighted least squares (DWLS) estimation was used for structural equation modeling (SEM) without item parceling (Little et al. 2002; Mindrila 2010). Models were evaluated using significance coefficients and fit indexes (χ^2/df , Tucker–Lewis Index, comparative fit index, and root mean square error of approximation; Kumar and Kumar 2015), with the procedure summarized in Figure 4.

Characteristics of Respondents and General Questionnaire Results

The evaluation is based on questionnaire responses of 203 students (average age = 16.6 years old; 68 percent female), mostly from grammar school (90 percent). Prior to exploring the materials, respondents reported a moderate interest in geography (average of 2.46 on a 1–5 scale). Access was distributed across smartphones (44 percent), computers (37

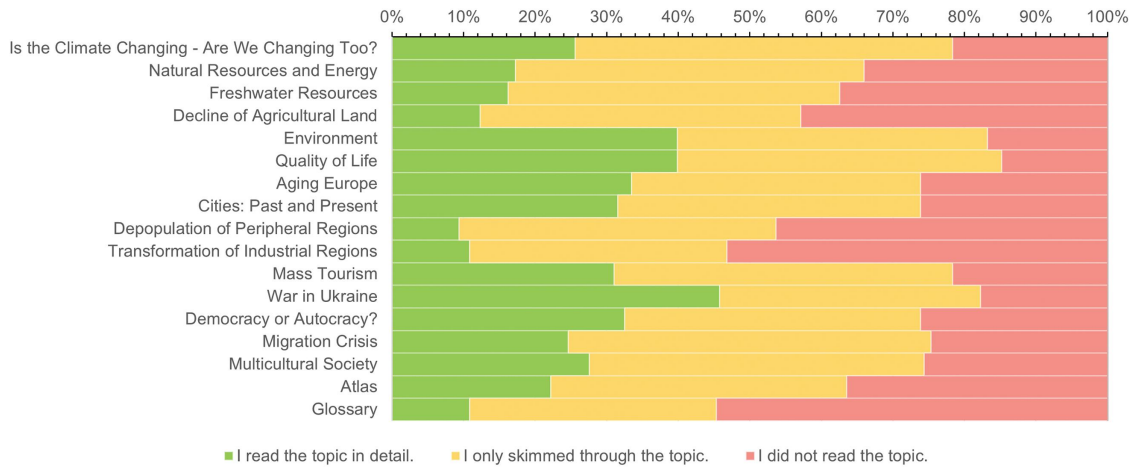


Figure 5 Respondents' preferences for individual chapters.

Table 3 Students' reflections and additional feedback on the digital textbook

Attitude		
	Positive	Negative with recommendation
Statements	It was a great experience. I really enjoyed it. I learned more about topics I'm interested in, such as democracy and migration. The topics were presented in an interesting way. Engaging images and graphs. Interactive quizzes at the end. Review tasks to reinforce learning. Clear layout and easy navigation. A different perspective on the topics, including concrete examples and clearly explained situations.	The mobile optimization could be improved. The textbook is too long. We live in a time when children and teenagers have a sadly short attention span, so I would definitely include more interactive sections. Regarding the topic of the war in Ukraine, I appreciate the amount of factual information, but I still feel that some parts were presented from a subjective point of view. Too little highlighted text and not enough emphasized keywords.

percent), and tablets (19 percent), highlighting the necessity of responsive design. Students engaged with the content based on individual interests (Figure 5).

Students showed the greatest interest in current issues that they also encounter in everyday life and the media, such as the war in Ukraine, environmental concerns, and quality of life. Conversely, they devoted the least amount of time to topics related to peripheral regions and the transformation of industrial areas. Some students also shared their impressions and experiences with the digital textbook in the final open-ended question (Table 3). Most of the comments were positive, with students particularly appreciating the multimedia elements, although several respondents noted that they would welcome even more of these features. A few students remarked that the materials felt too lengthy and expressed a preference for more highlighted text or clearly marked keywords throughout the content.

For the digital textbook evaluation, respondents clearly agreed most with the statements “The digital textbook is a source of current geographical information about Europe” (PU1), or “The interactive

maps, images, videos, and animations in the digital textbook caught my attention” (PP2). On the other hand, students disagreed most with statements “I intend to continue using the digital textbook when studying other subjects or in my free time” (CI2), and “I intend to continue using the digital textbook in geography” (CI1). Finally, we note that there are exactly three questions without the lowest rating evaluation (all the other questions are evaluated at all five levels at least once): PP2 (see earlier), “In addition to the geography of Europe, I also learned a lot of new and interesting information from other areas from the digital textbook” (PU3), and “I am satisfied with the use, operation, and functions of the digital textbook” (S3).

Analysis of the Digital Textbook Using the Expectation Confirmation Model

Validity: Principal Component Analysis

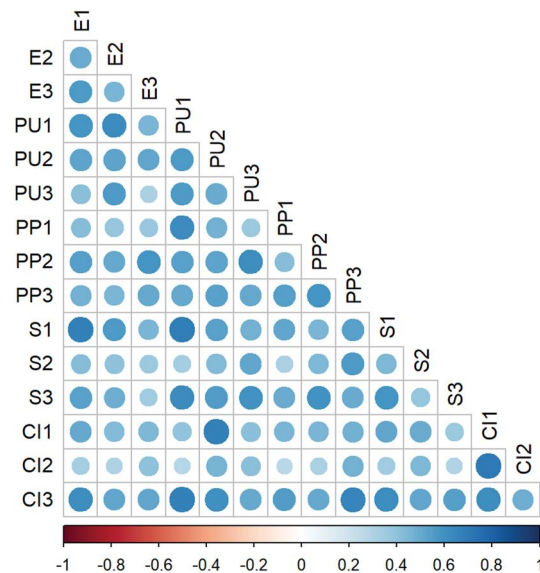
To verify the validity of the questionnaire, we performed a factor analysis; specifically we used PCA.

expectations, as we have exactly five main content categories in the questionnaire.

According to the fact that the responses could be “random” (i.e., students might not have paid sufficient attention to the questionnaire), we calculate Cronbach’s alphas (Table 4) to measure the internal consistency among satisfaction, expectation, perceived usefulness, perceived playfulness, and continuance intention questions, respectively.

Table 4 The internal consistency of responses

Item group	Cronbach's alpha
Expectation	0.70
Perceived usefulness	0.72
Perceived playfulness	0.68
Satisfaction	0.66
Continuance intention	0.77



Structural Equation Modeling

Moreover, because one of the assumptions of (default) SEM using maximum likelihood estimation is the normality of the variables (Kumar and Kumar 2015), we need to verify it (Table 5).

One can also see it from the other rows: The first row contains the means of the variables (because we use a five-point Likert scale, in the case of normality the values are expected to be close to three), the second contains the standard deviations (which are actually around one), and finally the skewness and kurtosis values are found in the third and fourth

[illegible]

rows, respectively (they should be around zero and three, respectively). Hence, the variables do not fit the normal distribution, and the maximum likelihood estimator cannot be used. Instead, we use DWLS (Mindrila 2010).

Given the previous conclusions, we implemented the hypothesized model using DWLS estimation for SEM. Many of the path coefficients were not statistically significant, however; specifically:

- None of the effects of expectation, perceived playfulness, and perceived usefulness on satisfaction were statistically significant (with p values equal to 0.56, 0.50, and 0.77, respectively).
- None of the effects of satisfaction, perceived playfulness, and perceived usefulness on continuance intention to use were statistically significant (with p values equal to 0.18, 0.85, and 0.70, respectively).

Therefore, a revised model was created after removing nonsignificant paths. Table 6 compares the hypothesized model and the revised model.

In terms of the goodness of fit, the results for the revised model were better (Schreiber et al. 2006), so this model is final in this study: $\chi^2(24) = 36.22$, $\chi^2/df = 1.51$, Tucker–Lewis index = 0.95, comparative fit index = 0.97, root mean square error of approximation = 0.05). The summary of the path coefficients in the final model is given in Table 7.

The effect of expectation on perceived playfulness was 0.91 (with $SE = 0.08$, $z = 10.37$). The effect of expectation on perceived usefulness was 0.98 (with $SE = 0.08$, $z = 12.66$). Both effects were statistically significant ($p < 0.05$). To sum up, the findings supported Hypotheses 1 and 2. Hypotheses 3 and 4 were not supported, however. The revised (final) model with standardized path coefficients is presented in Figure 7.

Note 1. Some sources (Gollner et al. 2017; Soto and John 2017) recommend using maximum likelihood estimator for noncontinuous variables provided a large data sample according to the central limit theorem. Thus, we have also performed such

SEM. The significance of effects resulted in the same final model (here, with the coefficients 0.93 and 0.98, respectively). This model had even worse significance, however.

Note 2. We have also attempted to construct a structural equation model using the item averages for each of the five questions, but the result was not appropriate (with respect to the significance).

Note 3. Finally, we have also used the averages to perform simple linear regressions—a stand-alone linear model for each hypothesis. Such models were inappropriate, however, because it would be necessary to transform the data (to satisfy the assumptions), which is not desirable for us.

Discussion

Although this case study focuses on Slovakia, its findings could apply globally, as it examines a digital regional geography textbook. Since the 1980s, Slovak geography education has seen reduced lessons and more flexible curricula (Tolmáči and Karolčík 2017), with the 2023 reform emphasizing human–environment relationships and positioning teachers as adaptive curriculum designers (Vojteková and Vojtek 2024). The post-2023 phase further encourages creativity, interdisciplinarity, and inquiry-based learning to prepare students for life in the Anthropocene (Fazio 2023). The digital

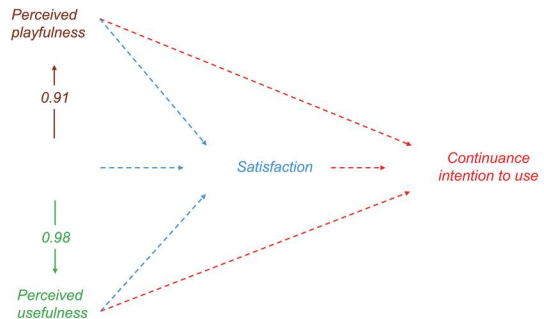


Figure 7 Revised model with standardized path coefficients.

Table 6 Comparison of the hypothesized model and revised model

Models	χ^2	df	p value	TLI	CFI	RMSEA	90% CI RMSEA (lower)	90% CI RMSEA (upper)
Hypothesized	164.33	82	0.00	0.92	0.94	0.07	0.05	0.09
Revised	36.22	24	0.05	0.95	0.97	0.05	0.00	0.08

Note: TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval.

Table 7 Comparison of the hypothesized model and revised model

	Unstandardized coefficient	Standardized coefficient	SE	z
Expectation → Perceived playfulness	0.82	0.91	0.08	10.37
Expectation → Perceived usefulness	1.06	0.98	0.08	12.66

materials studied align with this reform, reflecting relevant European topics grounded in students' own experiences. Mentz (2007) highlighted why learning the geography of Europe is essential, a principle that can be applied to teaching regional geography globally. Regional geography textbooks, with content that is closely connected to students' everyday lives, are important in strengthening the relationship between the student and geography, which influences their subsequent academic and personal development (Burnett and Crowe 2016).

Out of the four proposed hypotheses, only the first two (H1 and H2) were confirmed. Expectation positively affected perceived playfulness and perceived usefulness in digital-textbook-integrated classes. These results might be related to the modern design of the textbook, which is one of the key factors for effective knowledge acquisition (Behnke 2016). According to research by Biddulph and Adey (2003), students perceive extensive text in textbooks negatively, which was also reflected in the responses in our study. Students lose interest in geography when only passive effort is required, such as listening to lectures or copying from the board or textbook (Al-Nofli 2010; Sözen 2019). On the other hand, they appreciate working with digital maps (Hibszter 2011). This is precisely why the combination of text and supplementary interactive multimedia content is a major advantage of the digital version of the textbook. Continuous development and the practice of visual literacy (i.e., decoding visual elements) is essential in geographic education (Rose 2003). We therefore consider the ArcGIS StoryMaps environment to be a highly useful tool for developing geography digital teaching materials, as confirmed by previous research (Duan 2023; Nuryadin, Utaya, and Astina 2025).

None of the hypotheses related to the continued use of the textbook were supported. The intention to continue using digital textbooks refers to a student's voluntary intention to consistently use digital textbooks in extracurricular activities, as well as in regular lessons and homework assignments (Joo, Park, and Shin 2017). This might relate to the declining interest of students in geography. Geography as a school subject faces an identity crisis, which is also linked to the lack of solutions to improve the image of the subject (Korvasová 2021; Virranmäki et al. 2021). According to a 2019 study of Slovak primary school students (Karolčík et al. 2019), students expressed a positive attitude toward geography; however, their interest in continuing the study of geography and pursuing a career in this field was minimal. Sanina (2019) pointed out that poorly structured curricula and textbooks overloaded with information and complex concepts are among the main reasons for the decreasing popularity of geography.

Therefore, it is important to create modern, up-to-date, and sustainable educational texts containing clear, factual professional content complemented by appropriate multimedia materials. The Royal Geographical Society (2022) also emphasized the need to enhance students' perception of geography by clearly explaining the various career paths and opportunities available to geographers. Piróg (2018) highlighted the need to create a clear list of professional destinations for geography graduates. High school students increasingly focus on subjects or fields they wish to pursue at university or in their future careers. Empirical evidence shows that students' intentions to continue using electronic texts are directly and meaningfully influenced by their satisfaction with the texts and the perceived usefulness of those texts (Stone and Baker-Eveleth 2013). If a student does not see the relevance of a subject or understand its real-world application, educational texts might appear irrelevant to their future studies. The popularity of a specific scientific discipline depends on multiple factors, including changing demographic processes, social changes, demand for specialists in the economy, the status and reputation of the discipline, and individual interest (Wojtowicz 2011).

The intention to continue using a digital textbook in the future can also be significantly influenced by organizational and pedagogical frameworks, particularly the teacher's requirements within the geography course. When a textbook is mandatory and forms the basis for final assessment questions, students are motivated to use it actively (Stone and Baker-Eveleth 2013). In our study, however, the digital textbook was made available to students only as a supplementary resource during lessons, without subsequent evaluation through exams or tests. Consequently, there was no external pressure to use it, which might have influenced the questionnaire results. The students' intention to continue using this textbook can thus be considered genuinely voluntary, expressed based on their own decision, although the influence of parents also plays an important role in shaping their motivation (Lestari, Ahmad, and Suryani 2022). Enhancing students' motivation has a direct impact on their engagement with the subject, consequently contributing to improved academic outcomes (Park and Huynh 2015).

The results of the questionnaire could also have been distorted by other factors. The Cronbach's alpha values, which indicate the internal consistency of students' responses, were at the lower threshold. This suggests that some students might not have paid sufficient attention when completing the questionnaire. Because the respondents came from different secondary schools, their answers might also have been influenced by the geography teacher, their teaching style (Wallace, Kelcey, and Ruzek

2016), and the associated overall attitude toward the subject of geography (Rahn et al. 2019).

Despite their benefits, digital textbooks face limitations such as unequal access to technology (Purwanto, Nasution, and Anggoro 2023). In Slovakia, this is being addressed through a large-scale reform financed by the European Union Recovery and Resilience Plan. This initiative focuses on updating educational methods and providing digital infrastructure, aiming for 90 percent of schools to meet the European Highly Equipped and Connected Classroom (HECC) standard by 2025. Furthermore, analyzing student motivation is crucial for guiding curricular improvements and enhancing overall teaching quality (Schunk 2016; Piróg 2018). This enables teachers to use digital tools to enhance their pedagogical skills and stay updated on new trends and approaches in teaching. The use of various tools and applications can make lessons more engaging and interactive, increasing student motivation. The development of digital learning materials is therefore a promising direction for the future in terms of accessibility for all students. Introducing such innovations in education also enhances students' digital skills. Creating a digital textbook focused on current issues in the European context, which Slovak students are most closely connected to, is also in line with curricular reform, which emphasizes cross-cutting and multidisciplinary topics. The digitalization of textbooks has become a global phenomenon, and governments as well as commercial publishers must find sustainable models for the evolving textbook market (UNESCO 2023).

A textbook is a primary source of information in the teaching of science subjects and should be closely aligned with the curriculum. Thus, integrating digital learning materials into new curricula is an appropriate and necessary strategy (Agustinah et al. 2023). Although many studies suggest that students still prefer printed textbooks for study due to better readability and perceived reliability (Liu 2005), the only way to incorporate multimedia elements as illustrative examples into the teaching process is through digital learning materials.

Based on the results of our research, and in line with findings from other studies, digital learning materials can be considered a suitable complement to traditional (printed) textbooks. They enable an effective connection between theoretical knowledge acquired from basic literature, actual data, and multimedia content that cannot be provided in printed form but significantly contributes to a deeper understanding of the subject matter (Esteves 2019; Li and Jiang 2024). Findings from systematic and comprehensive evaluations of scientific research indicate that digital study materials can improve students' comprehension and encourage them to study geography (Ghafar et al. 2023).

Conclusion

Although the digital textbook *Current Issues of Europe* was evaluated positively by students, they did not show a strong interest in using it outside of lessons. This is likely related to the overall popularity of geography as a subject, which students often perceive as personally less relevant or promising. They therefore lack motivation to engage with it in their free time. Additionally, the use of the textbook was voluntary in our study, with no requirement for tests or exams based on its content, which might have affected students' engagement.

We therefore recommend using the textbook as a primary learning resource for topics on current European issues and challenges. Creating learning materials that integrate substantive textual content with complementary multimedia elements is crucial for effective and modern education. This combination was also positively evaluated by students in the questionnaire.

Digital textbooks of this type provide a sustainable solution, as their content can be easily edited and continuously updated. This is particularly important for geography—a discipline that reflects dynamic changes in landscapes over time and across different spatial contexts—where visual elements play a key role in understanding the subject matter. Research and teaching practice confirm that students best perceive and understand events that directly relate to their daily reality, especially those encountered in the media or public discourse. Traditional printed textbooks, however, cannot respond flexibly to rapidly changing current topics, which significantly limits their usability in contemporary education. ■

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The data containing questionnaire responses are available from the corresponding author on request.

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