

## ARTICLE

# Effect of Technology while Teaching National Geographic Learning (NGL) Life Series Books: Perceptions of Teachers and Students

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## ABSTRACT

This mixed-methods study explores the perceived effectiveness of National Geographic Learning (NGL) Life Series digital tools in English as a Foreign Language (EFL) instruction drawing on both student and teacher perspectives. Data were collected over a four-month period (January–April 2025) using structured questionnaires from 100 students and semi-structured interviews with six EFL instructors. Quantitative findings reveal that 88% of students reported enhanced classroom engagement, while 83% of teachers observed improved participation, both attributing these outcomes to the tools' interactive and gamified features. However, internet connectivity issues reported by 42% of respondents and by 29% as insufficient device access hindered seamless integration. In addition, 50% of teachers identified concerns regarding the cultural alignment with pedagogical relevance. The findings underscore the necessity of developing robust digital infrastructure and providing sustained professional development for educators to optimize the pedagogical utility of such tools for both engagement and effectiveness.

**Keywords:** Technology integration; National Geographic Learning; Digital resources; EFL teaching; Student–teacher perceptions

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# 1. Introduction

The landscape of English language instruction has been profoundly transformed by digital technologies, particularly in the EFL contexts. Digital integration now plays a central role in fostering interactive, student-centered, and multimodal experiences of learning. Within this framework, technology offers three major pedagogical advantages: exposure to authentic multimedia language content, facilitation of collaborative learning, and provision of immediate feedback, each of which supports effective language acquisition <sup>[1,2]</sup>.

In response to this shift, National Geographic Learning's *Life Series* stands out as a prominent example of blended instruction, combining print textbooks with interactive digital tools. Drawing on the Technological Pedagogical Content Knowledge (TPACK) framework <sup>[3]</sup>. This study explores how EFL learners and instructors perceive the integration of NGL Life Series tools in Saudi classrooms. The study also considers how these tools align with key learning principles such as cognitive load management <sup>[4]</sup>, and communicative competence development <sup>[5]</sup>.

Despite these strengths, technology implementation remains uneven, especially in developing regions. It has been noted that digital literacy gaps <sup>[6]</sup>, and the absence of sustained teacher training <sup>[7]</sup> pose persistent challenges. These issues are especially evident in the Saudi context, where digital divides and cultural incongruities impact classroom practices <sup>[8]</sup>. In other studies, Khan <sup>[9–14]</sup> studied different aspects of teaching–learning in Saudi Arabia including digital platforms, Blended learning and Augmented learning environment, and concluded that both teachers and students were found comfortable in learning via online platforms even relying on self learning. Alqarni <sup>[15]</sup> has also explored virtual and augmented learning advantages in the Saudi context. Khan <sup>[10]</sup> identified certain barriers in the learning of English in Saudi Arabia. Addressing these barriers is essential for harnessing the full potential of tools like the NGL Life Series.

Authenticity and cultural relevance were assessed by a formal committee constituted prior to implementation of the curriculum change: transformation from traditional book-based material to fully online content. The life series has its own App/platform to use in the classrooms; how-

ever, the blackboard learn was also utilised to support the academic activities of the students.

# 2. Literature Review

## 2.1. Importance of electronic content

The *Life Series* exemplifies research-driven educational design that integrates print and digital resources into a cohesive learning system. Empirical studies demonstrate that technology-enhanced instruction improves learning outcomes and student engagement by 23–28% compared to traditional methods, reveals Mayer <sup>[1]</sup>. Specifically, the *Life Series* supports two pedagogical functions:

1. Intercultural Competence: Authentic content from National Geographic fosters global awareness and aligns with Byram et al's <sup>[16]</sup> model of intercultural communicative competence.
2. Skill Progression: Structured advancement from receptive to productive skills mirrors best practices in second language acquisition <sup>[17]</sup>.

While the design offers clear pedagogical advantages, adoption is uneven. Pegrum et al. <sup>[7]</sup> report that teachers require 4–6 weeks to adapt blended systems, underscoring the need for ongoing training. Kessler's <sup>[6]</sup> longitudinal study further suggests that access alone is insufficient—successful integration demands pedagogical recalibration.

The TPACK framework <sup>[3]</sup> effectively captures this dynamic interdependence of technological fluency, pedagogical strategy, and content expertise. Warschauer's <sup>[18]</sup> model of digital competence includes technical skills, critical thinking, and communication—aligns well with the interactive features of the Life Series. However, challenges such as poor infrastructure and limited teacher training, especially in rural areas, still hinder effective implementation. **Figure1** is a screenshot of the electronic resources provided by the series.

Recent studies expand this conversation by emphasizing socio-emotional dimensions of digital learning which enhance self-efficacy through mastery experiences. Hodges et al. <sup>[19]</sup> foster autonomy via flexible hybrid pathways <sup>[20]</sup>, and improve emotional regulation by reducing anxiety through structured design <sup>[21]</sup>. Similarly, gamification research <sup>[22]</sup> highlights features of some drivers of

engagement. These findings mirror the interactive, gamified elements of the *Life Series* and reinforce its value in promoting not only cognitive gains but also emotional and social development. Nonetheless, cultural alignment

remains a critical issue. Around 72% of teachers adapt content to local values <sup>[23]</sup>. Globalized materials require intentional scaffolding to resonate with learners' lived experiences <sup>[5]</sup>.

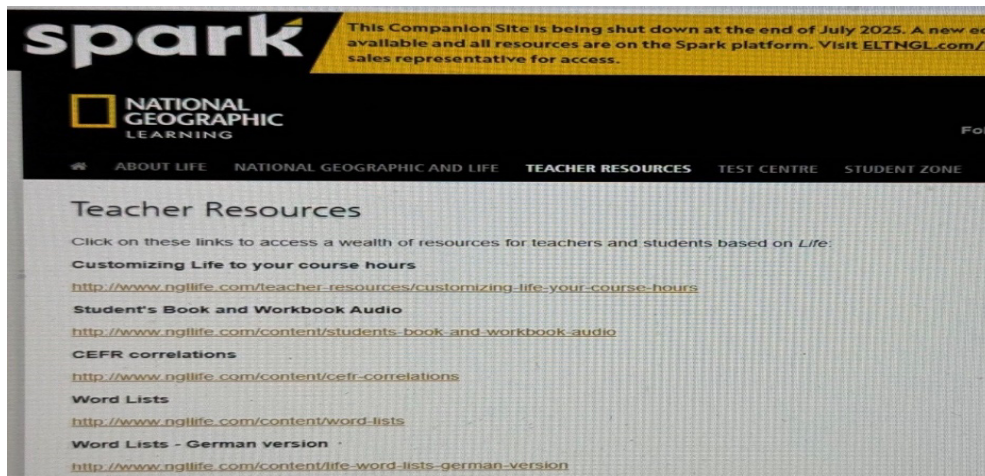


Figure 1. NGL Life Series Book.

Moreover, the persistent training gap noted by Kessler <sup>[6]</sup> where only 42% of teachers feel prepared for technology integration limits the realization of digital tools' full potential. This affects the efficacy of gamified content, which can increase task persistence by 40% <sup>[4]</sup> but only when accompanied by strong pedagogical framing.

Keeping these points in view, this study studies : (1) how Saudi EFL teachers and students perceive the digital NGL Life Series tools, (2) how these tools align with pedagogical goals, and (3) what contextual and infrastructural factors shape their implementation. By triangulating quantitative and qualitative data, this research seeks to provide practical insights into maximizing technology use for effective language instruction in diverse educational settings.

## 2.2. Significance of the Study

This study contributes to a growing body of research on digital tool effectiveness in EFL settings. It highlights the pedagogical benefits of the NGL Life Series in promoting student engagement, underscores the necessity for continuous teacher training and professional development, and draws attention to the challenges of cultural adaptation and infrastructure. These insights are particularly important for policymakers, pedagogues, educators, educationists, curriculum designers and textbook writers aiming to enhance

digital integration in language classrooms.

## 2.3. Research Problem

This study aims to investigate the effectiveness of NGL Life Series digital tools in enhancing EFL instruction, focusing on both teachers' and students' perceptions regarding their impact on student engagement, learning outcomes, and pedagogical adaptability. Specifically, the research explores how these digital tools align with the pedagogical goals of traditional textbooks, their ability to foster active learning through multimedia integration, and the challenges related to technical issues and cultural relevance in the context of Saudi Arabian EFL classrooms. The study utilizes a mixed-methods approach using questionnaires and semi-structured interviews to develop a comprehensive understanding of technology integration into English language teaching (ELT), and its effectiveness in promoting interactive learning and student motivation in diverse educational environments.

## 2.4. Research Objectives and Questions

### 2.4.1. Research Objectives

1. To assess the impact of NGL Life Series digital tools on student engagement in EFL classrooms.

2. To explore teacher preparedness and confidence regarding the integration of digital tools.
3. To evaluate the alignment of digital content with pedagogical goals and textbook frameworks.
4. To investigate the cultural relevance of the digital materials in the Saudi EFL context.
5. To identify the infrastructural and technical challenges affecting tool implementation.

#### 2.4.2. Research Questions

1. What are teachers' and students' perceptions of the effectiveness of NGL Life Series digital tools?
2. How prepared and confident are teachers in integrating these digital tools into instruction?
3. How well do the NGL Life Series digital tools align with the pedagogical goals of the printed textbooks?
4. To what extent is the content culturally relevant to Saudi EFL learners?
5. What technical and infrastructural barriers hinder the implementation of these tools?

### 3. Methodology

#### 3.1. Research Design

This study used a mixed-methods research design which combined both quantitative and qualitative approaches to study the perceptions towards the NGL Life Series digital tools, and implementation in Saudi EFL classrooms. Specifically, the study explored the perspectives of both students and teachers on usability, pedagogical alignment, cultural relevance, and infrastructural challenges. Quantitative data were collected through questionnaires for the students. On the other hand, the qualitative data were gathered via semi-structured interviews (for the teachers). Subsequently, a thematic analysis was done to assess the usefulness of the NGL Life Series textbooks (both printed and online). The research was conducted over a four-month period in Technology-Enhanced Language Learning (TELL) environments at Applied College(s) using the Life Series curriculum/textbooks.

#### 3.2. Participants and Sampling

The study employed a 'purposive sampling strategy' to

select participants with substantial, first-hand experience using the *NGL Life Series* digital tools in EFL instruction. This non-random sampling approach was appropriate for the study's exploratory objectives, as it enabled the selection of information-rich cases capable of offering in-depth insights into pedagogical practices and perceptions.

The sample included 100 undergraduate EFL students, chosen based on their regular participation in *Technology-Enhanced Language Learning (TELL)* classrooms that had adopted the *NGL Life Series* curriculum for at least one semester. This ensured that students had sufficient exposure to evaluate the tools' usability, engagement, and relevance, along with 6 EFL instructors with maximum teaching experience of teaching English and at least one year of teaching the Life Series. Their inclusion was based on their ability to reflect critically on the integration, adaptation, and instructional impact of the digital tools. The sampling decisions were guided by the principle of maximum relevance rather than statistical generalizability, aligning with the qualitative goal of capturing nuanced, context-specific insights.

#### 3.3. Qualitative Coding and Analysis

The qualitative data comprising transcribed semi-structured interviews and textbook content analysis were analyzed using reflexive thematic analysis <sup>[24]</sup>. This method was selected for its flexibility and capacity to identify both semantic and latent patterns across diverse data sources. The coding process followed six rigorously defined phases: Familiarization with raw transcripts and notes through repeated reading, Initial coding, where meaningful data units were labeled line-by-line, Theme identification, grouping similar codes into broader thematic categories, Theme review, ensuring coherence across and within themes, Theme definition, articulating the scope and focus of each theme, Report writing, linking themes to research questions and integrating illustrative quotes.

To enhance trustworthiness, coding was conducted independently by two trained researchers, who then met to reconcile discrepancies and refine thematic structures. Intercoder agreement was achieved through iterative discussion, and a detailed codebook with operational definitions was maintained. An audit trail documented all coding decisions, enhancing both transparency and replicability.

### 3.4. Data Collection Tools

The following tools were used to ensure data triangulation and capture multiple dimensions of the research problem:

#### 3.4.1. Student Questionnaire

A structured instrument designed to gather quantitative data on students' perceptions (Appendix A) regarding the usability, effectiveness, and cultural appropriateness of NGL Life Series digital tools.

#### 3.4.2. Teacher Interviews

The study used 'semi-structured interviews' with concerned instructors (Appendix B) to know about teachers' preparedness, confidence, support needs, and perceived barriers to digital integration.

#### 3.4.3. Textbook Analysis

A qualitative analysis of the NGL Life Series textbooks and corresponding digital tools was carried out using the six-step thematic analysis model proposed by Braun and Clarke [24]. This framework was selected for its flexibility in identifying both semantic and latent themes in educational content, making it particularly suited for exploring pedagogical alignment.

#### 3.4.4. Ethical consideration

Based on the principles of ethical considerations, the consent forms were filled in from both the sample groups (Appendices C&D). No conflict of interest was noticed. Confidential issues were tackled. Written consents were taken mainly by three ways: personal contact, university emails and WhatsApp.

## 4. Data analysis

Quantitative data (drawn from the student questionnaires) were analyzed by using descriptive statistics (percentages, mean scores) to identify patterns in usability, motivation, and engagement; inferential statistics (e.g., t-tests) were also applied to enhance analytical depth. Qualitative data from teacher interviews were analyzed by thematic analysis [24] which has six phases. Coding is extremely important in thematic analysis. Familiarisation is the first phase followed by the coding. Theme generation, review, definition, and interpretation are the other four phases. This model was chosen for its balance of flexibility and rigor, supporting both inductive and deductive reasoning and aligning well with the mixed-methods nature of this study. It allowed themes to emerge from teacher narratives while mapping to frameworks such as Chapelle's [25] CALL criteria. Its transparent structure minimized coder bias—unlike less systematic methods like grounded theory [26]. Additionally, it helped bridge qualitative and quantitative insights, e.g., linking teacher-reported technical barriers with student survey findings, unlike discourse analysis [27], which focuses more on linguistic features than pedagogical application. This integrative, theory-aligned framework effectively addressed both the digital tools' instructional value and contextual implementation challenges.

### 4.1. Results and Analysis by Research Questions

#### 4.1.1. RQ1: Perceptions of Effectiveness of NGL Life Series Digital Tools

##### *Quantitative Results: Students' Perspectives*

A Likert-scale questionnaire (N = 100) revealed generally positive student perceptions regarding usability, engagement, motivation, learning support, and multimedia use. **Table 1** summarizes student responses.

**Table 1.** Students' Perceptions of NGL Life Series Digital Tools.

Question	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean
1. The NGL Life Series digital tools are easy to use.	52 (52%)	36 (36%)	10 (10%)	2 (2%)	0 (0%)	4.3
2. The digital tools improved student engagement.	55 (55%)	35 (35%)	8 (8%)	2 (2%)	0 (0%)	4.4



Table 1. Cont.

Question	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean
3. The NGL Life Series digital tools helped me learn better.	50 (50%)	38 (38%)	10 (10%)	2 (2%)	0 (0%)	4.3
4. I felt motivated to study more using the digital tools.	53(53%)	37 (37%)	8 (8%)	2 (2%)	0 (0%)	4.3
5. I would recommend using NGL Life Series digital tools in other subjects.	54 (54%)	34 (34%)	8 (8%)	3 (3%)	1 (1%)	4.4
6. The content in the digital tools reflects my cultural background.	30 (30%)	40 (40%)	20 (20%)	8 (8%)	2 (2%)	3.9
7. The tools allowed me to collaborate better with my peers.	45 (45%)	38 (38%)	12 (12%)	4 (4%)	1 (1%)	4.2
8. I felt confident using the NGL Life Series app.	42 (42%)	40 (40%)	10 (10%)	6 (6%)	2 (2%)	4.1
9. The videos and visuals helped me understand lessons better.	50 (50%)	36 (36%)	10 (10%)	3 (3%)	1 (1%)	4.3
10. I experienced technical issues while using the tools.	10 (10%)	20 (20%)	15 (15%)	30 (30%)	25 (25%)	2.6

**Table 1** presents 52–55% of students strongly agreed that the tools enhanced usability, engagement, and motivation (Mean≈4.3–4.4), Multimedia features were rated highly for enhancing comprehension (Mean=4.3), Cultural relevance received a relatively lower score (Mean=3.9) and Technical issues (Q10) had a notably low mean (2.6), indicating a negative experience for some students. **Figure 2** shows the mean score (1-5) for the students' perception.

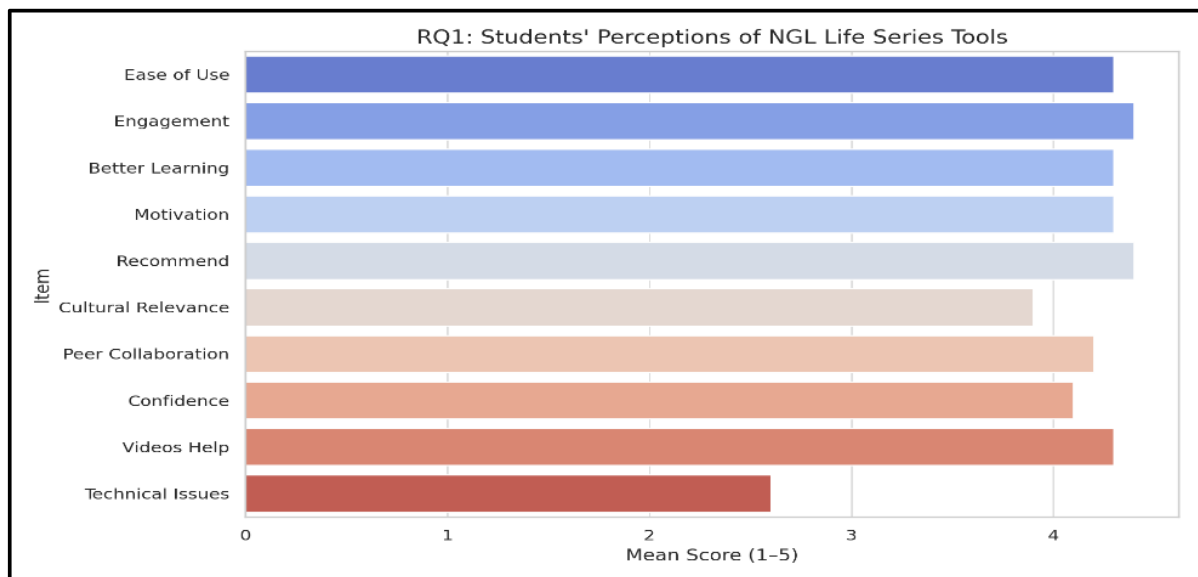


Figure 2. Students' perception of NGL LIFE Series Tool.

### Quantitative Results: Teachers' Perspectives

**Table 2** displays responses from Teachers (N = 6), who similarly expressed favorable views in **Table 1** espe-

cially in Student engagement (Mean = 4.83), ease of use (Mean = 4.67) and Pedagogical alignment (Mean = 4.33). However, technical challenges (Mean = 3.3) and limit-

ed cultural alignment (Mean = 3.83) were also noted. An independent-samples t-test was conducted to examine whether technical issues (Q10) affected engagement (Q2) and motivation (Q4).

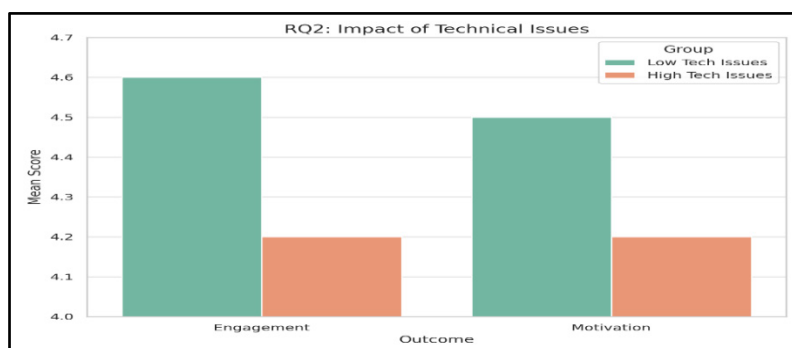
**Table 2.** Teachers' Perceptions of NGL Life Series Digital Tools.

Question	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Mean
1. The NGL Life Series digital tools are easy to use.	4 (67%)	2 (33%)	0 (0%)	0 (0%)	0 (0%)	4.67
2. The digital tools improved student engagement.	5 (83%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)	4.83
3. The NGL Life Series digital tools helped students learn better.	4 (67%)	2 (33%)	0 (0%)	0 (0%)	0 (0%)	4.67
4. I feel confident using NGL Life Series digital tools in my lessons.	3 (50%)	2 (33%)	1 (17%)	0 (0%)	0 (0%)	4.1
5. I would recommend using NGL Life Series digital tools in other subjects.	4 (67%)	2 (33%)	0 (0%)	0 (0%)	0 (0%)	4.67
6. I find the content culturally appropriate for my students.	2 (33%)	2 (33%)	1 (17%)	1 (17%)	0 (0%)	3.83
7. I received adequate support to implement the digital tools.	1 (17%)	2 (33%)	2 (33%)	1 (17%)	0 (0%)	3.5
8. The digital materials align with my lesson objectives.	3 (50%)	2 (33%)	1 (17%)	0 (0%)	0 (0%)	4.33
9. I have faced technical challenges while using these tools.	2 (33%)	1 (17%)	1 (17%)	1 (17%)	1 (17%)	3.3
10. I find the tools suitable for different learning styles.	3 (50%)	2 (33%)	1 (17%)	0 (0%)	0 (0%)	4.33

**Table 3** shows negative impact on learners' motivation and engagement. On the other hand, **Figure 3** explains technical barriers in the engagement and motivation process.

**Table 3.** Impact of technical Barrier on Engagement and motivation.

Outcome	Group	Mean	SD	t-value	Df	p-value	Significance
Engagement	Low Tech Issues (A)	4.6	0.48	3.14	83	0.002	Yes
	High Tech Issues (B)	4.2	0.55				
Motivation	Low Tech Issues (A)	4.5	0.51	2.72	83	0.008	Yes
	High Tech Issues (B)	4.2	0.60				



**Figure 3.** Impact of Technical issues on Motivation and Engagement.

Students facing fewer technical issues reported significantly higher engagement and motivation ( $p < 0.01$ ), reinforcing the need for robust digital infrastructure.

## 4.2. Data Analysis and Results RQ2

**Teachers' Preparedness, confidence, Pedagogical experiences and Adaptation**

Data sources were Teacher Questionnaire Items (confidence, training, support) and interview responses (codes: “training gaps,” “tech readiness,” “digital confidence”). The following were the identified themes: Digital Confidence: Most teachers (5 out of 6) expressed confidence in using the NGL Life Series tools in the classroom, citing their user-friendly interfaces and repeated exposure. A direct quote from one teacher reflects this: “After the first few weeks, it became second nature to include these tools in my lesson planning.” and Need for Ongoing Professional Development: While basic confidence was high, 6 of the 6 participants indicated they would benefit from continuous training — especially in areas like interactive features, student data tracking, or culturally sensitive adaptations. One teacher noted, “We were shown the basics, but we

need workshops on making it more effective.”

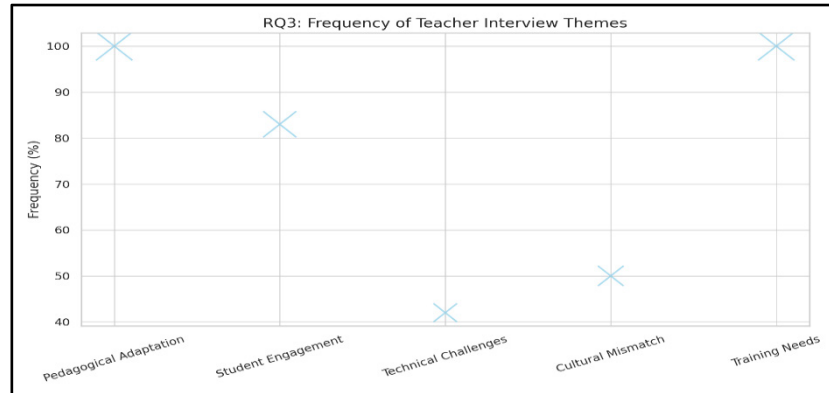
### Teachers’ Pedagogical Experiences and Adaptations

**Table 4** shows teachers’ perceptions and adaptations about the NGL Digital Tool while **Figure 4** deals with the impact of technical issues perceived by the teachers. Teachers consistently appreciated the pedagogical value and motivational features of the Life Series tools, but noted serious concerns about digital access, cultural fit, and lack of ongoing training support.

**Table 5** demonstrates moderate to high confidence in using the tools but reveals a need for sustained, focused professional development. This supports global findings that one-time digital onboarding is insufficient in evolving educational contexts.

**Table 4.** Teachers’ Perceptions and Adaptations about NGL Digital Tool.

Theme	Sub-theme	% Mentioned	Representative Quote
Pedagogical Adaptation	Flexibility, Blended Use	100%, 67%	“I use the textbook to explain grammar, then the app.”
Student Engagement & Motivation	Gamification, Multimedia	83%, 78%	“Leaderboards doubled homework completion.”
Technical Challenges	Connectivity, Devices	42%, 29%	“Students can’t access videos, I need alternatives.”
Cultural Mismatch	Western Content	50%	“The app lacks local relevance.”
Professional Development	Continued Training	100%	“We need follow-ups, not just intro demos.”



**Figure 4.** Impact of technical issues.

**Table 5.** Teachers’ confidence, and preparedness in using the tool.

Statement	SA	A	N	D	SD	Mean
I feel confident using the NGL Life Series digital tools in my lessons.	3	2	1	0	0	4.5
I received adequate training/support for using these tools.	1	2	2	1	0	3.5

## 4.3. Data Analysis and Results of RQ3

### Digital tools align with the instructional and pedagogical goals of the printed textbooks

Data sources were Textbook + Digital Tool Compar-

ison (Textbook Analysis) and Teacher Interviews for this research question. Results via Braun & Clarke’s Thematic Analysis show the Theme 1 Strong Structural Alignment: The majority of the lessons in the digital tools directly map onto the unit themes and objectives of the print textbook.



Teachers noted that the online tasks were not supplementary, but parallel particularly in grammar practice, listening modules, and life skills. Theme 2: Discrepancies in Depth and Assessment: Some teachers highlighted gaps in critical thinking or speaking assessment tasks online. For example, one noted: “While the grammar and vocabulary are aligned, there is minimal practice for extended speaking or problem-solving like we expect from the printed series.”

**Table 6** showed digital tools aligned well with core in-

structional goals (grammar, listening, vocabulary) but underrepresented higher-order thinking and speaking tasks, indicating room for improvement in holistic pedagogical alignment.

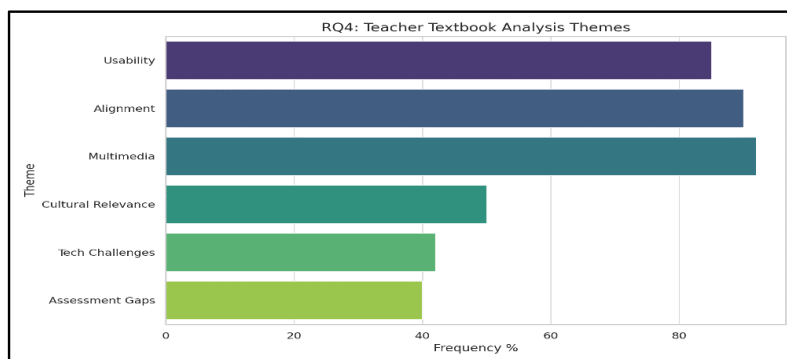
**Table 7** depicts the connection between digital and pedagogical tools. The components deal are: usability of the tools, structural alignment, multimedia integration in addition to the technical challenges. Similarly, **Figure 5** shows teachers’ responses to the themes of the textbook.

**Table 6.** Digital Tool Alignment with core instructional goals.

Printed Textbook Goal	Digital Tool Match	Comments
Listening comprehension	Included	Aligned with authentic audio clips
Critical thinking (discussion prompts)	Partial	Lacks depth compared to print
Grammar in context	Included	Reinforced through online activities
Cultural reflections	Not included	Missing in digital format

**Table 7.** Alignment of Digital tools with Textbook Pedagogical goals.

Theme	Frequency	Description
Usability	85%	Easy navigation and classroom readiness
Structural Alignment	90%	Content aligns well with textbook objectives
Multimedia Integration	92%	Videos and interactive tasks enhanced comprehension and engagement
Cultural Relevance	50%	Need for more localized and culturally appropriate content
Technical Challenges	42%	Compatibility issues limited accessibility
Depth and Assessment Gaps	40%	Weaknesses in developing critical thinking and speaking skills



**Figure 5.** Text-book Analysis Themes.

The digital tools are pedagogically aligned and effective for content delivery, but improvements are needed in cultural localization, technical accessibility, and assessment design.

**Table 8** shows reflections on the cultural connection which is extremely important in the context of Saudi Ara-

bia as the country is culturally rich.

Both quantitative and qualitative data indicate that while the content is professionally designed, its globalized nature reduces relatability for Saudi students. This suggests a need for localized adaptations or additional scaffolding by instructors.

**Table 8.** Integration of cultural material.

Statement	SA	A	N	D	SD	Mean
The content in the digital tools reflects my/our cultural background.	2	2	1	1	0	3.9

#### 4.4. Data Analysis and Results RQ4

##### Content Cultural Relevance to Saudi EFL learners

Data sources for this research question were Student and Teacher Questionnaires and Teacher Interviews. Results from teachers' interviews follow:

Theme 1: Moderate Cultural Disconnect: Teachers and students both reported that the content, while globally rich, lacks localized relevance. Most visual examples, idioms, and contexts are Western-centric. As one teacher shared: "There's hardly any content students can relate to from their everyday Saudi life."

#### 4.5. RQ5: Technical and infrastructural barriers hinder the implementation of these tools

Data sources for this question were the Student and Teacher Questionnaire Items and the teacher interview. Results of the interviews were as follows:

Technical Challenges emerge as a refined theme and despite the positive perceptions of the digital tools, technical challenges emerged as a major concern for 42% of teachers, particularly regarding internet connectivity. Teachers from rural areas mentioned difficulties in accessing digital content, with one teacher stating, "Students in rural areas often can't access videos, so I have to prepare alternate materials" (T5). Additionally, 29% of teachers reported device availability issues, where not all students had access to the required digital devices. As one teacher explained, "Not all students have access to devices, which limits their ability to use the digital tools effectively" (T6). These technical limitations hindered the full potential of the digital tools and required teachers to adapt by finding workarounds, such as using offline resources.

Table 9 presents data regarding the technical issues related to the digital tool and usability. Some students (even teachers) are not at home in digital utilization which is quite normal. They are trained from time to time, to deal with such issues.

Table 9. Technical Issue using Digital tool.

Statement	SA	A	N	D	SD	Mean
I experienced technical issues while using the digital tools.	2	1	1	1	1	3.3

Technical issues remain a barrier to smooth implementation, particularly due to inconsistent Wi-Fi, lack of devices, and limited IT support all of which diminish the effectiveness of the NGL Life Series tools.

## 5. Summary of Key Findings and Discussion

Discussion of the key findings (RQ1–RQ5) derived from the mixed-methods investigation of the NGL Life Series digital tools in Saudi EFL classrooms by triangulating student and teacher questionnaires, semi-structured interviews, and textbook analysis.

### 5.1. RQ1: What are teachers' and students' perceptions of the effectiveness of NGL Life Series digital tools?

The findings indicate overwhelmingly positive perceptions of the NGL Life Series digital tools among both

students and teachers. From the student perspective, 88% agreed or strongly agreed that the tools were easy to navigate, with a high mean score of 4.3. A remarkable 90% reported increased engagement during lessons (Mean = 4.4), while 88% expressed that the tools motivated them to study and enhanced their learning experience. These outcomes are consistent with Mayer's <sup>[1]</sup> multimedia learning theory, which emphasizes the role of interactive and audio-visual elements in boosting comprehension and retention. Furthermore, 83% of students agreed that the tools supported better collaboration, and the visuals and video components received high appreciation (Mean = 4.3). However, challenges emerged around cultural fit and technical reliability. Only 70% of students felt the content reflected their cultural background, indicating a moderate mean of 3.9, while 30% cited frequent technical difficulties, particularly related to device access and internet stability, resulting in a low mean score of 2.6. These challenges reinforce the importance of contextual adaptation and infrastructure

support.

Teachers echoed students' positive sentiments. All six teachers reported that the tools were easy to use (Mean = 4.67) and unanimously agreed on their effectiveness in enhancing student engagement (Mean = 4.83). They also demonstrated high confidence in using the tools during instruction and expressed a willingness to recommend them across other subjects. Nonetheless, only 66% of teachers rated the content as culturally appropriate (Mean = 3.83), and there were concerns over the adequacy of training and support, with the lowest mean score (3.5) related to institutional preparedness. These findings support Chapelle's [28] assertion that the success of digital tools depends not only on design and interactivity but also on cultural resonance and teacher support systems. King Abdulaziz University has been utilizing the Electronic Learning Management System (ELMS) for all courses even before the COVID-19 scenario. During the pandemic, the learning system was enhanced by online content that suited self-learning mode. NGL series is an example of a hybrid learning system that is supported by Noble [29]. The Life series has integrated many game-based activities in the textbook(s) which students practice at home as an assignment. This is another example of an interesting activity related to self-learning mode. The idea goes in accordance with many researchers including Noble and Chan [30] who emphasized the Gamification for Higher Education Applications.

## 5.2.RQ2: How prepared and confident are teachers in integrating these digital tools into instruction?

Quantitative data show that 83% of teachers felt confident in integrating digital tools (Mean = 4.5), but their satisfaction with training and support was moderate (Mean = 3.5). This finding was substantiated by qualitative interviews in which 100% of teachers discussed modifying their teaching methods to integrate digital resources. Teachers adopted blended learning approaches—67% reported combining printed textbooks with digital features to create interactive, flexible lessons. Despite this adaptability and baseline confidence, every teacher stressed the need for sustained and targeted professional development. As one stated, *"We need follow-up sessions to troubleshoot real classroom issues—not just introductory demos."* This

supports Kessler's [6] emphasis on iterative, hands-on training tailored to local classroom needs. The study makes clear that confidence in using digital tools cannot substitute for institutional support, resource accessibility, and ongoing development programs.

## 5.3.RQ3: How well do the NGL Life Series digital tools align with the pedagogical goals of the printed textbooks?

The NGL Life Series digital tools were found to align strongly with core elements of the printed curriculum. Based on both textbook analysis and teacher feedback, 90% of teachers reported that digital activities reinforced grammar, vocabulary, and listening goals already embedded in the textbook. This structural alignment allowed seamless integration, with teachers often transitioning from textbook instruction to app-based activities. The ease of navigation (85%) and multimedia engagement (92%) further facilitated this pedagogical connection. However, alignment was not comprehensive. Half of the teachers raised concerns about the lack of higher-order learning tasks such as critical thinking prompts and open-ended speaking activities. One teacher observed, *"While the grammar and vocabulary are aligned, there is minimal practice for extended speaking or problem-solving."* This discrepancy supports Pegrum et al's [7] argument that digital integration must encompass both surface-level alignment and deeper cognitive engagement. The current tools offer foundational support but require enrichment for advanced skills development.

## 5.4.RQ4: To what extent is the content culturally relevant to Saudi EFL learners?

Cultural relevance emerged as a moderate concern. While students and teachers acknowledged the high production quality and global appeal of the NGL Life Series materials, 50% of teachers and 30% of students reported that the content felt Western-centric. Teachers found themselves adapting certain examples or skipping culturally incongruent segments. A recurring observation was, *"Some of the cultural references in the app don't resonate with our students—we need more culturally relevant examples."* This concern aligns with Chapelle [28], who argues that

learners in non-Western contexts benefit most from content that affirms their own cultural identity and experiences. With mean scores of 3.83 (teachers) and 3.9 (students), the study highlights a need for localized digital materials or support frameworks to help contextualize global content within Saudi cultural norms. Without this alignment, even well-designed tools may lose relevance or emotional resonance for learners.

### 5.5. RQ5: What technical and infrastructural barriers hinder the implementation of these tools?

Despite the pedagogical promise of the NGL Life Series digital tools, technical and infrastructural challenges significantly affected implementation, particularly in un-

der-resourced or rural settings. According to the teacher questionnaire, 42% of participants experienced consistent issues with internet connectivity and device availability (Mean = 3.3). Student data mirrored this, with the lowest mean score of 2.6 related to technical accessibility. Interviews further revealed that some teachers had to design alternate lessons due to poor infrastructure. As one teacher stated, “*Students in rural areas often can’t access videos, so I have to prepare alternate materials.*” These barriers align with OECD’s <sup>[31]</sup> findings on digital inequity and highlight the urgent need for infrastructure investment in schools. Without addressing the digital divide, the full potential of innovative educational technologies cannot be realized. **Table 10** presents the differences between the current study and previous research.

**Table 10.** Comparison of Present Findings with Prior Literature.

Research Question	Key Finding (This Study)	Supported by Prior Literature	What This Study Adds
<b>RQ1:</b> Perceptions of effectiveness	High student and teacher engagement (88–90%), usability, motivation	Mayer (2022) – multimedia learning improves retention; Chapelle (2017) – design impacts learning	Empirical evidence from Saudi EFL context using NGL Life Series; triangulation with both student and teacher perspectives
<b>RQ2:</b> Teacher preparedness	83% felt confident, but low satisfaction with training (Mean = 3.5)	Kessler (2021) – hands-on PD essential for tech integration	Highlights mismatch between confidence and institutional support; calls for iterative, needs-based PD
<b>RQ3:</b> Pedagogical alignment	Strong alignment for grammar and listening, weak for critical thinking and speaking	Dudeney & Hockly (2022) – digital tools must support higher-order skills	Identifies specific content gaps in NGL tools; supports blended use with textbook extensions
<b>RQ4:</b> Cultural relevance	50% of teachers, 30% of students noted Western-centric bias	Chapelle (2017) – importance of cultural resonance	Provides quantified evidence on cultural mismatch in digital content; recommends localized digital adaptation
<b>RQ5:</b> Infrastructure barriers	Connectivity (42%) and device access (29%) issues hinder implementation	OECD (2021) – digital divide in education	Demonstrates these challenges specifically in Saudi Applied Colleges; includes teacher workarounds and offline strategies

## 6. Implications for Policy, recommendations and conclusion

### 6.1. Implications

This study highlights three critical areas for stakeholders aiming to enhance the integration of digital tools in Saudi EFL classrooms: teacher development, infrastructure, and content localization. First, sustained professional development must be institutionalized—not as a one-time event but as an ongoing cycle that supports teachers in

adapting to evolving technologies and pedagogical models. Training should focus on both technical proficiency and pedagogical strategies for blended learning, fostering a reflective teaching culture.

Second, infrastructure upgrades are essential. Without reliable internet connectivity, sufficient device availability, and responsive IT support, even the most effective digital tools will remain underutilized. Policymakers must prioritize equitable access, particularly in rural and under-resourced schools, to reduce the digital divide.

Third, the findings underscore a pressing need for cul-

turally localized content. Digital materials should move beyond surface-level global aesthetics to integrate culturally meaningful themes, visuals, and tasks that resonate with learners' identities and lived realities. This calls for collaborative textbook development, where local educators, linguists, and curriculum designers contribute to adapting or co-creating digital content that aligns with national values and learner needs.

Future instructional practices should be guided by data-informed models that blend digital interactivity with cultural sensitivity. Developers of EFL curricula, both print and digital must design materials that are pedagogically sound, technologically accessible, and culturally responsive to foster meaningful and sustainable language learning.

This study identifies three actionable areas for stakeholders seeking to improve digital integration in Saudi EFL classrooms. First, sustained professional development must be implemented, not just as initial training but as a continuous cycle of support that addresses context-specific challenges. Second, infrastructure upgrades are essential. Institutions should prioritize internet reliability, device access, and IT support to overcome the systemic barriers limiting tool usage. Third, there is a critical need for culturally localized content that better reflects learners' lived experiences. Digital tools must move beyond global aesthetics to ensure regional appropriateness. Addressing these three pillars: training, access, and culture can ensure that digital tools like the NGL Life Series are not only used but embraced and optimized for long-term language development in Saudi Arabia.

## 6.2. Recommendations

1. Adapt digital tools to be more culturally relevant for diverse student populations.
2. Provide ongoing professional development focused on pedagogical integration of digital tools.
3. Simplify tool navigation and improve device compatibility.
4. Develop offline capabilities to ensure resources are accessible in areas with poor internet access.
5. Refine gamification elements to reduce stress while maintaining student motivation.

## 6.3. Conclusion

This study's novelty lies in its methodologically integrated approach, combining content analysis with empirical classroom data to assess one of the most globally distributed digital EFL programs. Rather than attempting a superficial comparison across tools, it provides a depth model for localized evaluation that future studies can adapt for other platforms. This study underscores the positive impact of *NGL Life Series* digital tools on student engagement, motivation, and learning outcomes in Saudi EFL classrooms. Both students and teachers reported high usability and pedagogical alignment, supporting the integration of interactive digital platforms in language instruction. However, persistent challenges including unstable internet connectivity, cultural misalignment of content, and unequal device access continue to limit full-scale adoption. To address these barriers, the study recommends three measurable and actionable steps:

1. Curriculum Adaptation: Collaborate with local educators and content developers to revise *Life Series* modules with at least 30% culturally localized content, including region-specific examples, visuals, and values.
2. Technology Grants and Infrastructure Support: Establish institutional partnerships or Ministry of Education grants aimed at funding basic tech kits (e.g., tablets, routers, and offline-enabled versions of apps) for under-resourced schools, particularly in rural regions.
3. Ongoing Teacher Training: Implement structured professional development programs with quarterly workshops and hands-on digital integration labs to ensure sustainable pedagogical use of digital tools.

Future research should adopt a longitudinal design to assess how consistent use of digital resources influences language proficiency over time. Additionally, comparative studies across different socioeconomic and institutional settings could provide deeper insight into best practices for scalable, equitable implementation of educational technologies.

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## Institutional Review Board State- Data Availability Statement

Not applicable.

The data were collected from the students of the college where the author teaches.

## Informed Consent Statement

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

## Conflicts of Interest

The authors declare no conflict of interest.

## Appendix A: Student Survey: Perceptions of NGL Life Series Digital Tools

Dear student: This survey supports a study on the effectiveness of digital tools used with the NGL Life Series in Saudi EFL classrooms. Your responses will offer insights into their usability, cultural relevance, and impact on learning. Participation is voluntary and anonymous. Please respond honestly based on your experience.

### Section A: Demographic Information

Question	Response Options	2. Age
1. Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female	3. Education Level

### Section B Perception Scale

**Instructions:** Indicate your agreement with the following statements.

No.	Statement	5	4	3	2	1
1	The NGL Life Series digital tools are easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	The digital tools improved my engagement in class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	The digital tools helped me learn better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	I felt motivated to study using the digital tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	I would recommend these tools for other subjects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	The content reflects my cultural background.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	The tools helped me collaborate better with classmates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	I felt confident using the digital app.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	The visuals and videos helped me understand lessons better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	I faced technical issues while using the digital tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Scale:** 5 = Strongly Agree    |    4 = Agree    |    3 = Neutral    |    2 = Disagree    |    1 = Strongly Disagree

## Appendix B: Teacher Survey: Perceptions of NGL Life Series Digital Tools

This survey is part of a research study that investigates the use of National Geographic Learning (NGL) Life Series digital tools in Saudi Arabian EFL classrooms. As a teacher, your feedback will help assess the practical integration, pedagogical alignment, and challenges associated with these tools. Participation is voluntary and confidential. Please answer each question truthfully according to your teaching experience.



## Section A: Demographic Information

Question	Response Options
1. Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
2. Age	<input type="checkbox"/> 23–30 <input type="checkbox"/> 31–40 <input type="checkbox"/> 41–50 <input type="checkbox"/> 51+
3. Educational Qualification	<input type="checkbox"/> BA <input type="checkbox"/> MA <input type="checkbox"/> MPhil <input type="checkbox"/> PhD
4. Years of Teaching Experience	<input type="checkbox"/> 0–2 <input type="checkbox"/> 3–5 <input type="checkbox"/> 6–10 <input type="checkbox"/> 10+

## Section B: Perception Scale

No.	Statement	5	4	3	2	1
1	The NGL Life Series digital tools are easy for teachers to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	The digital tools improved student engagement in class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	The tools helped students learn more effectively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	I feel confident using the digital tools during lessons.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	I would recommend using these tools in other subjects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	The content is culturally appropriate for Saudi learners.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	I received adequate support and training for using these tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	The digital materials align with my lesson objectives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	The tools support different student learning styles effectively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	I faced technical issues (e.g., connectivity, devices) using these tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix C: Ethical Consent Form

**Title of Study:** Effect of Technology while Teaching National Geographic Learning (NGL) Life Series Books: Perceptions of Teachers and Students.

This study investigates how digital tools integrated with the NGL Life Series influence English as a Foreign Language (EFL) instruction in Saudi classrooms. The aim is to evaluate usability, cultural relevance, and the pedagogical impact of these tools from both student and teacher perspectives.

You are invited to take part voluntarily. You may withdraw at any time without consequence and your responses will remain anonymous and confidential.

- Students and Teacher will complete a brief survey.
- Teachers will participate in a 20–30 minute semi-structured interview.

There are no risks associated with participation. Your input will help improve digital tool implementation in EFL settings. Data will be anonymized and used solely for academic research. No names or identifying information will be published.

By signing below, you confirm that:

- You understand the study's purpose and procedures.
- You voluntarily agree to participate.
- You are aware that you can withdraw at any stage.

## Appendix D: Semi-Structured Interview Protocol for Teachers

To explore EFL teachers' perceptions of the NGL Life Series digital tools, focusing on pedagogy, student engagement, cultural relevance, technical barriers, and training needs. 6 EFL instructors from Applied Colleges using NGL Life



- j.compcom.2020.102542
- [7] Pegrum, M., Hockly, N., Dudeney, G., 2022. *Digital Literacies*, 2nd ed. Routledge: New York, NY, USA. DOI: <https://doi.org/10.4324/9781003262541>
- [8] Al-Asmari, A.M., Rabb Khan, M.S., 2014. E-learning in Saudi Arabia: Past, present and future. *Near and Middle Eastern Journal of Research in Education*. 2014(1). DOI: <https://doi.org/10.5339/nmejre.2014.2>
- [9] Khan, I., 2011. Learning difficulties in English: Diagnosis and pedagogy in Saudi Arabia. *Educational Research*, 2 (7), 1248– 1257.
- [10] Khan, I.A., 2011. Challenges of teaching/learning English and management. *Global Journal of Human social science*. 11(8), 69–80.
- [11] Khan, I.A., 2016a. Effectiveness of E-learning for the Teaching of English: A Study of Comparative Strategies. *Advances in Language and Literary Studies*. 7(3), 125–35. DOI: <https://doi.org/10.7575/aiac.all.v.7n.3p.125>
- [12] Khan, I., 2016b. Barriers in the Learning of English: An Exploratory Study. *British Journal of Education, Society & Behavioural Science*. 15(2), 1–10. DOI: <https://doi.org/10.9734/BJESBS/2016/23743>
- [13] Khan, I.A., 2020. Electronic learning management system: Relevance, challenges and preparedness. *Journal of Emerging Technologies and Innovative Research*. 7(5), 471–80.
- [14] Khan, I.A., 2024. Psychology of color, integration of local culture and effect of infographics on English language learning. *PSU Research Review*. 8(1), 84–101. DOI: <https://doi.org/10.1108/prr-02-2021-0013>
- [15] Alqarni, A., 2023. Pedagogic Relevance of Integrating Augmented Reality in Saudi English Classrooms: A Systematic Review. *Asian Journal of Education and Social Studies*. 49(1), 68–78. DOI: <https://doi.org/10.9734/ajess/2023/v49i11101>
- [16] Byram, M., Gribkova, B., Starkey, H., 2002. Developing the intercultural dimension in language teaching: a practical introduction for teachers. Available from: <http://www.lrc.cornell.edu/director/intercultural.pdf>
- [17] Ortega, L., 2009. *Understanding Second Language Acquisition*, 1st ed. Routledge: London, UK. DOI: <https://doi.org/10.4324/9780203777282>
- [18] Warschauer, M., 2007. The paradoxical future of digital learning. *Learning Inquiry*. 1, 41–49. DOI: <https://doi.org/10.1007/s11519-007-0001-5>
- [19] Hodges, C. B., Moore, S., Lockee, B. B., et al., 2020. The difference between emergency remote teaching and online learning. Available from: <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- [20] Zhao, Y., Watterston, J., 2021. The changes we need: Education post COVID–19. *Journal of Educational Change*. 22(1), 3–12. DOI: <https://doi.org/10.1007/s10833-021-09417-3>
- [21] Rienties, B., K hler Simonsen, H., Herodotou, C., 2020. Defining the Boundaries Between Artificial Intelligence in Education, Computer-Supported Collaborative Learning, Educational Data Mining, and Learning Analytics: A Need for Coherence. *Frontiers in Education*. 5, 128. DOI: <https://doi.org/10.3389/feduc.2020.00128>
- [22] Hou, H.–T., 2023. Diverse Development and Future Challenges of Game-Based Learning and Gamified Teaching Research. *Education Sciences*. 13(4), 337. DOI: <https://doi.org/10.3390/educsci13040337>
- [23] Hockly, N., 2018. Blended Learning. *ELT Journal*. 72(1), 97–101. DOI: <https://doi.org/10.1093/elt/ccx058>
- [24] Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 3(2), 77–101. DOI: <https://doi.org/10.1191/1478088706qp063oa>
- [25] Chapelle, C.A., 2001. *Computer Applications in Second Language Acquisition*. Cambridge University Press: Cambridge, UK. pp 1–20. DOI: <https://doi.org/10.1017/CBO9781139524681>
- [26] El Hussein, M., Kennedy, A., Oliver, B., 2017. Grounded Theory and the Conundrum of Literature Review: Framework for Novice Researchers. *The Qualitative Report*. 22(4), 1198–1210. DOI: <https://doi.org/10.46743/2160-3715/2017.2661>
- [27] Gee, J.P., 2014. *An Introduction to Discourse Analysis: Theory and Method*, 4th ed. Routledge: London, UK. DOI: <https://doi.org/10.4324/9781315819679>
- [28] Chapelle, C.A., 2017. *The handbook of technology and second language teaching and learning*. Wiley: New Jersey, NJ, USA. pp 1–9. DOI: <https://doi.org/10.1002/9781118914069>
- [29] Noble, L., 2023. Emotional bridge in higher education: Enhancing self-efficacy and achievement through hybrid engagement. *ESP Review*. 5(2), 7–23.
- [30] Noble, L., Chan, S., 2024. Gamification for Higher Education Applications: A Social Learning Theory Approach. In: Martindale, T., Amankwatia, T.B., Cifuentes, L., et al. (eds.). *Handbook of Research in Online Learning: Insights and Advances*. Brill: Leiden, Netherlands. pp. 576–610. DOI: <https://doi.org/10.1163/9789004702813>
- [31] OECD., 2021. *Adapting Curriculum to Bridge Equity Gaps: Towards an Inclusive Curriculum*. OECD Publishing. DOI: <https://doi.org/10.1787/6b49e118-en>