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# The Impact of Teachers' LoTI and ICT Integration Abilities on Students' L2 Writing Competency in the Context of TPACK Framework

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## Abstract:

Although the outbreak of COVID-19 necessitated greater emphasis on digital education systems in Lebanon, public schools encountered barriers to implementing such improvements, chief among which involved English language teachers' lesser level of technology implementation (LoTI) capability in addition to their lower level of technological, pedagogical, and content knowledge (TPACK). Sixty students and four teachers were involved in this study. The teachers were asked to complete a survey and the data collected were analyzed quantitatively to investigate the relationship between the teacher respondents' level of understanding of information communication technology (ICT) implementation and the TPACK construct. To obtain additional information on the teachers' ICT competency, each was interviewed at the onset of the academic year using Newhouse's model (2002). To examine the relationship between students' performance and teachers' LoTI, IBM SPSS Statistics (Version 25) was used to analyze the interview data in addition to the results obtained from the experimental and control groups of the pre-and post-tests. These results revealed a constructive association between instructors' ability to combine their content knowledge with their best pedagogical practices and technology knowledge to leverage students' writing competency. This research explored this relationship in a novel approach that may be utilized by AlRafid school to provide a basis for further studies in various academic contexts at other public schools in Lebanon regarding teachers' technology use and understanding and its impact on student achievement.

**Keywords:** TPACK; LoTI; expository writing; ICT; educational technology.

## 1. Introduction

### 1.1. ICT in the Lebanese Education Sector

The Ministry of Education and Higher Education (MEHE) of Lebanon is working hard to overhaul the Lebanese curriculum and increase enrollment and retention in the formal education system. Part of this effort has involved encouraging teachers to design appropriate materials that match the content of textbooks (Carrascal, 2020). As schools seek to achieve high standards in shaping how to define and teach literacy skills, combining different existing materials with the technology of today gives rise to entirely new material properties. This is a necessity as public schools have been found to be lacking in teachers' preparation for using technology (Itani, 2018). This overhaul requires radical changes in methodology, classroom management, and instructional materials.

Beginning in 2003, the Office of the Minister of State for Administrative Reform ([OMSAR]; 2018) has been developing a "National e-strategy" to move Lebanon toward a knowledge-e-based society, and financial investment in educational technology has been made to support the educational process by equipping public schools with certain digital devices, such as computers and projectors controlled by laptops. However, adapting to e-learning has

often been challenging. Since 2019, the MEHE's efforts aimed at improving learning outcomes for students in public schools. It has included projects such as the Quality Instruction Towards Access and Basic Education Improvement (QITABI) effort, which is a collaboration with the Ana Aqra Association, America-Mideast Educational and Training Services (Amideast), and Management System International (MSI) to provide technical assistance and capacity-building for low-income schools' districts that serve such students (Ana Aqra Association, 2019). Furthermore, the Direction d'Orientation Pédagogique et Scolaire (DOPS) project was created in collaboration with MEHE to inspire teachers to redefine teaching to suit the needs of today's digital-age learners (United Nations High Commissioner for Refugees [UNHCR], 2019).

Although the MEHE is actively implementing digital transformation in schools to address the public health and safety requirements of limiting the spread of COVID-19, Lebanese high school instructors continue to encounter obstacles when it comes to incorporating information communications technology (ICT). Several studies have been undertaken to identify the problems encountered when ICT integration is attempted in Lebanese public high schools in addition to addressing the persistent barriers that exist in public schools, including access to ICT devices, program/instruction design, technical support, teaching methods, lack of access to software, inadequate time for course planning, and insufficient administrative support from the Ministry of Education (Ghamrawi, 2018; Itani, 2018; UNHCR, 2019; UNICEF, 2017; Yehya et al., 2018).

## 1.2. Objectives of the Study

This research aims to gain a deeper understanding of how Lebanese high school teachers use ICT in their classrooms and the factors that influence their levels of technological, pedagogical, and content knowledge. By investigating the effective integration of ICT, the study hopes to provide insight into how technology can be used to enhance the learning process in Lebanese schools. Additionally, this research enhances the understanding of how ICT can be effectively integrated into high school classrooms in Lebanon. The study has several key objectives that aim to address the challenges facing the integration of ICT in Lebanese high schools and contribute to the successful use of ICT tools in all public schools in Lebanon.

Firstly, the study aims to provide an understanding of how ICT is currently being integrated into Lebanese classrooms, specifically in the context of writing expository essays. The research will examine the methods used by high school teachers in Lebanon when integrating ICT in writing instruction, and identify areas for improvement and best practices for integrating ICT in writing instruction. This will provide insights into how to make the use of ICT more effective in this specific area.

Secondly, the study aims to assess the level of technological, pedagogical, and content knowledge (TPACK) of high school teachers in Lebanon. By understanding the teachers' knowledge, decision-makers will be able to identify any weaknesses or barriers that may be hindering the effective use of ICT technology in the classroom. This includes understanding the teachers' level of comfort and proficiency in using ICT in their teaching and identifying the areas where they need more support.

Thirdly, the study aims to examine the impact of using ICT tools on the expository writing performance of grade 10 students learning English as a foreign language. This will provide insight into the effectiveness of using ICT in language education and whether the students' performance improves or not.

Fourthly, the study aims to investigate the relationship between TPACK and other variables such as teacher experience, professional development opportunities, and the availability of ICT resources and devices. This will provide a holistic understanding of the factors that impact the integration of ICT in high schools in Lebanon. By taking into consideration the specific context of Lebanon and the challenges that the country faces, the research can provide recommendations that are tailored to the specific needs of the Lebanese education system.

Overall, the findings of this research will be valuable in informing educational reform and improving the implementation of ICT in Lebanese high schools by providing insight on how to effectively use ICT in the classroom and how to support teachers in their integration of ICT in the teaching process.

## 1.3. Significance of the Study

This study aims to make a significant contribution to the research on the integration and testing of ICT knowledge of teachers in an underrepresented area, specifically the influence of integrating ICT within the TPACK framework on the performance of Grade 10 Arabic-speaking students in L2 expository essay writing.

Theoretically and practically, this study can contribute to the field of education technology in several ways:

- It can provide a deeper understanding of the factors that influence the effective integration of ICT in high school classrooms in Lebanon, including the levels of technological, pedagogical, and content knowledge of

teachers, the availability of resources and devices, and the alignment of teaching strategies with student needs.

- It can support the development of the TPACK framework by examining how it is applied in the Lebanese context and identifying any cultural or contextual differences that may impact its effectiveness.
- It can bring a new perspective on how ICT can be effectively used in language education and the impact of technology on student performance in writing.
- It can contribute to the identification of any barriers or challenges to the integration of ICT in Lebanese high schools and provide recommendations for addressing these challenges to improve the implementation of technology in the classroom.
- It can be beneficial to the understanding of the specific context of Lebanon and the challenges that the country faces and provide recommendations that are tailored to the specific needs of the Lebanese education system.
- The study will also be of significance to the field of e-learning and demonstrate how technology can be effectively used to improve teaching and learning in the era of e-learning and distance learning.

The studies conducted by Soler-Costa et al. (2021) and Irwanto (2021) highlight the growing body of research on ICT within the context of the TPACK framework. The bibliometric review conducted by Soler-Costa et al. found that the amount of research on TPACK has grown rapidly over the period of 2006 to 2019. This growth in research highlights the increasing importance of understanding the integration of technology in education, and the role of teachers' technological, pedagogical, and content knowledge in this process.

The work of Irwanto (2021) confirms this trend by showing that the United States (32.08%) leads in contributions on the topic, followed by Turkey (11.32%), Australia (9.43%), Singapore, and Taiwan. It is notable that Lebanon did not feature on the list, highlighting the gap in research on the integration of ICT in education in this specific country. This underrepresentation of Lebanon in the research on ICT and TPACK highlights the importance of this study in contributing to the understanding of how ICT is integrated into Lebanese classrooms and the methods applied, specifically in writing expository essays and how it can influence the performance of grade 10 Arabic-speaking students in L2 expository essay writing.

Overall, the present study is a novel contribution to the research that will provide critical insights into the integration of ICT in education in Lebanon and help teachers in the public sector achieve better performance in this era of e-learning.

#### 1.4. Research Hypotheses

The integration of ICT in education has become a crucial aspect of modern learning. However, the implementation of ICT in high schools, specifically in Lebanon, has been met with several challenges. The researchers chose to tackle this issue for three main reasons: (1) decision-makers and instructors in Lebanon want to make significant changes in the educational curriculum by using ICT. However, without proper monitoring and examination of the integration of ICT and the technological pedagogical content knowledge (TPACK) of high school teachers, these changes may not be as effective as they could be. By determining the levels of TPACK of teachers, one can ensure that they are capable of utilizing ICT in their teaching and that they are provided with the necessary training and support to do so. (2) High school students need real changes in their performance through integrating effective and advanced teaching practices that fit their needs. They are not simply looking for ICT tools to be installed in their schools, but they are asking for these tools to be activated and used effectively by professional and qualified teachers. This will help to improve student engagement, motivation, and overall performance in their studies. Lastly, there are various constraints that may impact the effective integration of ICT throughout the learning process. These include the accessibility of ICT resources and technological devices, planning and integrating the TPACK construct, as well as management and support. Without addressing these constraints, the effective integration of ICT in high schools may be hindered, and the potential benefits of ICT for education may not be fully realized. Therefore, the integration of ICT in high schools is a complex issue that requires careful consideration and planning to be successful. By addressing the challenges of monitoring and examination of the integration of ICT, professional development of teachers, and addressing variable constraints, students, instructors, and stakeholders can work towards ensuring that high school students in Lebanon have access to the best possible education.

From the above-discussed reasons, one can postulate the following hypothesis:

- **H1.** The availability of ICT resources in the context of the TPACK framework in addition to teachers' strategic planning are not indicators of the efficiency of ICT technologies employed at AlRafid school.
- **H2.** Teachers classified with high LoTI levels have no impact on the L2 expository writing performance of Grade 10 students.

## 2. Literature Review

Researchers have shown that teachers are key to whether ICT tools are integrated successfully into their schools and classrooms (Ra et al., 2019). For this reason, teachers are required to develop managerial skills. Joo and Choi (2021) found that even if technological devices and instruments are readily available, they will be useless if

educators lack the basic skills and knowledge necessary for integrating them into their classroom practices. Bowman et al. (2022) argued that the quality and quantity of professional development programs for teachers impact instructors' level of knowledge in working with ICT. Joo and Choi (2021) added that effective training on pedagogical content is also needed rather than solely focusing on training teachers regarding how to utilize ICT. Bowman et al. (2022) stated that such professional development content must address teachers' needs for their classes before committing any changes to their skills and knowledge.

### 2.1. TPACK Theoretical Framework

Shulman (1986) identified seven categories of knowledge crucial for supporting teachers' knowledge growth. The first three categories are concerned with content, whereas the next four are concerned with pedagogy. The categories are presented as follows: "content knowledge, curriculum knowledge, pedagogical content knowledge, general pedagogical knowledge, knowledge of students and their features, knowledge of educational circumstances, knowledge of pedagogical ends, ethics, and their philosophical grounds" (Shulman, 1986, p. 8). Mishra and Koehler (2006) introduced TPACK as a conceptual framework to describe teachers' knowledge for efficient use of ICT technologies in the classroom, emphasizing the need for educators to understand how content, pedagogy, and technology operate together and must be considered inseparable if technology is to be utilized to successfully improve education. Harris and Hofer (2011) also stressed the importance of addressing needs in both the content and technology areas to support educators in achieving their goals. Most current TPACK research efforts are concerned with characterizing and quantifying the TPACK construct and its components. It is rare to find a study that offers the TPACK model as a comprehensive and successful teaching technique that may assist in improving students' English writing skills while also advising on how teachers can consider its application when developing curriculum.

### 2.2. LoTI Digital Age Framework

LoTI, which stands for Levels of Teaching Innovation, is intended to be used as a tool to aid policymakers in measuring how instructors use technology in their classrooms (Moersch, 1994). The updated version then concentrated on the sensitive balance that exists between instruction, assessment, and the efficient utilization of digital tools and resources. This version is used to improve high-order thinking, involve students in learning, and activities in classrooms which confirms the objectives of the 21<sup>st</sup>-century characteristics in the educational process. Moersch (2010) used this framework to evaluate the way teachers combine ICT with instruction, positing that instructors progress through eight phases of transformation when they employ ICT tools in classroom activities in their courses (see Methodology section). However, the advanced model ensures the utilization of digital tools and resources in all educational processes. All levels of the updated version of the LoTI framework represent a unique quality or feature of the educational spectrum as teachers transition from: (a) lower levels of student knowledge to higher levels of student knowledge, including problem-solving and assessment; (b) a teacher-centered approach to a learner-centered approach; (c) classroom regular and repeated practices, to complicated and difficult ones, such as formulating a hypothesis and encouraging students to raise questions; and (d) controllable usage of technological devices to vital and autonomous utilization.

Based on our review of the existing literature, we found that ICT implementation is viewed as the knowledge base instructors require to better the teaching-learning process via the lens of published frameworks and models.

## 3. Methodology

### 3.1. Research Design

Combining qualitative (interview) and quantitative (survey, tests) methods of investigation resulted in the significant strength of the current mixed-methods study (Creswell, 2012). Triangulation, in this instance, was focused on one case, in which the same English instructors completed a survey and were also interviewed. The responses from both data sets were combined and compared. A subjective and interpretivist approach was associated with this qualitative research since the investigators cannot treat, control, or interfere in how subjects are set into groups. Add to this, they were unable to determine the process each group gets, but they only tested out the results and contributed to formulating hypotheses.

### 3.2. Participants

The research was conducted at AlRafid school, a public high school located in the West Bekaa district. After conducting a semi-structured interview, the researchers established the following inclusion criteria for the study's teacher participants: Grade 10 English-language instructors at the AlRafid high school with low to moderate ICT competence but a willingness to participate in proficiency training sessions on the application of ICT in the classroom. Based on these criteria, we located four Lebanese female Grade 10 teachers aged 24–50 years who were interested in taking part in the study and explained the structure and objectives of the research. Each of the teachers holds a master's degree in English and are full-time teachers with 8+ years of experience. These participants also stated that MEHE had not organized any training sessions to support them in developing their ICT skills in the last



3 years. The student participants were the 60 Grade 10 students assigned to the two L2 writing classes of each of the teachers. They were all Lebanese Arabs and share the same cultural background. Furthermore, all the students had passed the Brevet, the Lebanese Official Exams taken in Grade 9. Students were randomly assigned to two groups of 30 students each aged between 15-17 years. In section A/control, there were 20 females and 10 males; in section B/experimental, there were 18 females and 12 males.

### 3.3. Instruments

Creswell (2012) stated that the study instruments should be determined by the type and purpose of the investigation. Based on this study's mixed methods design, the researchers employed a structured survey, a semi-structured interview, and administered two writing tests (pre and post) to the students.

Yet, a pilot study was conducted a year before the main research study to evaluate the method and instruments used to investigate the effect of using ICT tools in teaching expository writing. Its aim was to determine the validity and reliability of the method and instruments used in the full-scale study. With respect to the questionnaire and the interview, the ultimate aim of conducting a pilot study was to: (1) evaluate the suitability of the questionnaire for the local setting, (2) assess the validity, reliability, and usefulness of the instruments, (3) determine if any criteria observed in the class need to be modified or added, (4) evaluate the clarity, appropriateness, and significance of the questionnaire and interview items, identifying any difficulties in answering them, (5) Estimate the time required to complete the questionnaire and interview, and (6) identify any unforeseen difficulties during a classroom observation. The researchers obtained accurate responses from four English teachers at Al Rafid by clearly explaining the importance of the survey and addressing any questions they had about the phrasing of the items. After collecting the completed survey, the data were analyzed by first checking for any unanswered questions and noting any unclear or vague items and comments made by the teachers. Answers were coded and entered into the database of the statistical package for the social science (SPSS) program. Item analysis was then conducted. The reliability of the instrument was also determined, with an alpha value of .7326 for the pilot study and .755 for the original study. Based on these results, any ambiguous or problematic words, phrases, or items were clarified or simplified. To improve the feasibility and accuracy of the observation, modifications were made to the checklist, such as limiting the interview time to 20 minutes. This was done due to the potential challenges the researchers may face while trying to observe all the criteria on the checklist. To furthermore ensure the reliability and validity of the study, the instruments were evaluated by two external researchers in the field who reviewed the instruments for any repetition or overlap among items and provided feedback on whether any items needed to be removed, replaced, or clarified. Based on their feedback and the Cronbach's Alpha, five items were removed from the teachers' level of ICT technology use as they were either not suitable for the Lebanese English context or were duplicated elsewhere.

#### 3.3.1. Survey

To avoid confusion, the teachers were given an overview of the survey and the purpose of filling it out correctly before they began. The survey took approximately 20-25 minutes to complete. The Cronbach alpha reliability was used to measure the internal consistency of the survey and the scale was used to test its content validity. The survey included standardized questions to ensure the successful compilation of the data over a short period of time and utilized a Likert scale where the four teachers were asked to mark their degree of agreement with several items. The teacher respondents were asked to indicate their answers by checking statements that ranged from very positive to very negative toward attitudinal objects. The teachers were requested to fill in the LoTI Digital Age Survey to measure their level of ICT knowledge (see Appendix A). The first part of the survey included questions designed to obtain demographic information from the four participants. The second part comprised items that measured the teachers' level of ICT knowledge. Finally, the third and largest part of the instrument included items regarding personal computer utilization and technological instructional techniques on a 7-point scale of: 1 = *Never*, 2 = *At least once a semester*, 3 = *At least once a month*, 4 = *A few times a month*, 5 = *At least once a week*, 6 = *A few times a week*, and 7 = *Daily*. Cronbach's alpha was used to establish the internal consistency of the survey.

#### 3.3.2. Semi-Structured Interview

To establish trustworthiness for this study's interview, it was important to use rigorous research methods and to follow established standards for research design, data collection, and analysis. Additionally, several strategies were used to increase trustworthiness:

- To establish credibility for a semi-structured interview, it is important to have a clear understanding of the research question and to have a well-designed interview guide that includes open-ended questions. The researchers are already experts in the field and possess a good understanding of the subject matter and train graduate students in interviewing techniques.
- To establish dependability for the interview, it was important to have a clear and consistent process for conducting the interviews, as well as for documenting and analyzing the data. Here are several strategies that

were used to increase dependability: detailed documentation, training, inter-rater reliability, pilot testing, data storage, and management, in addition to ethical considerations.

- To establish confirmability, it was important to use multiple sources of data, such as observations and documents, in addition to the interviews. This allows other researchers to confirm the findings through their own analysis of the data. Additionally, using a semi-structured interview guide and a clear coding scheme can help increase the confirmability of the findings.

The four teachers were interviewed before the start of the first semester of the 2019-2020 school year. This semi-structured interview was conducted to obtain a clear understanding of each teacher's position regarding integrating ICT into instruction and to evaluate their requirements to proceed to the next level. The interview protocol provided an opportunity for the four respondents to provide feedback without any restrictions and employed Newhouse's (2003) framework of professional ICT attributes for teachers (see Appendix B); it included three main parts: (a) measuring teachers' TPACK (part A), (b) technology integration and use (part B), and (c) teacher ICT capabilities (part C). The interview relied on a five-stage progression of inaction, investigation, transformation, implementation, and application to portray the teachers' capacity to utilize ICT. This part included 13 items and teachers had to verbally answer with: *yes, I have competence*, *no I have no competence*, and *I have moderate competence*. The second part of the interview (integration and use) investigated whether teachers integrated ICT in their teaching-learning process and the levels of their proficiency in doing so. The interviews were audio-taped and lasted for 20 minutes each. Following that, the acquired data were numerically coded, computed using MS Excel, and statistically interpreted. Excel spreadsheets and SPSS were used to analyze the teachers' recordings. The data from the audio files of the interviews were organized into computer-documented text files. The data were then evaluated again after categorizing and coding the collected data using preliminary categories and themes to describe the primary themes and sub-themes. In terms of coding, all data were analyzed item by item while focusing on the themes identified in the previous step. For each interviewee, appropriate conclusions and notes were highlighted. Finally, supplemental interpretative notes were generated based on the data gathered under a single theme.

### 3.3.3. The Pre and post Writing Test

Students in Sections A and B took the pre- and post-writing tests (see Appendix C & D). The experimental and control groups had two sessions at the start of the academic year to do a brief revision with their lecturers on the five essential components of a successful essay. Following the application of the two teaching sessions—each lasting 90 min (two 45-min scholastic periods)—and the performance of a writing sample for the two portions, both groups met once a week.

Each group of 30 students (i.e., experimental and control) was required to complete the pre-writing exam in a single session. Before the administration of the pre-writing test, each group was given similar instructions. Both groups followed the identical L2 writing curriculum, and each had one writing session every week. Teacher A taught the Section A pupils (the control group) using the conventional manner; the Section B group (the experimental group) was instructed by Teacher B using the most recent and readily available ICT technologies. Both sets of students were given summative assessments for the expository writing examinations.

Both groups received a cause-and-effect organizer sheet to complete as a tool to help them construct the essay. Students in the experimental group viewed a real-life narrative about the world's heaviest man that was presented via an LCD projector. Furthermore, they received a PowerPoint presentation about people who are obese and the daily challenges they face that was provided via email a week previous. On the other hand, students in the control group brainstormed ideas in the organizer sheet using standard methods as part of the conventional teaching format. The post-writing test aimed to assess whether students benefitted more from being taught using technology or being taught using traditional methods. The grades of the students in both groups were compared in the pre and post by the researchers using the summative assessment to recognize any improvement. Students were assessed using the following categories:

**Table (1): Scoring rubric for student L2 writing competency**

Category	Content and Organization	Vocabulary	Language Mechanics
Poor	Less than 4.0	Less than 3.5	Less than 1.5
Good	4.0 to 6.0	3.5 to 5.5	1.5 to 2.0
Excellent	6.0 or more	5.5 or more	More than 2.0

### 3.4. Procedure

First, the 4 teachers of the four sections of L2 writing for Grade 10 students were asked to complete the survey, and then after they completed it, and before the experiment began, they were interviewed, (ii) next, two of these four (Teacher B is considered Tec-savvy as compared to Teacher A who is not knowledgeable nor showed enthusiast with EdTech) were asked to participate in the experiment with their 2019 Fall Semester L2 writing classes of Grade 10 students, (iii) the students of the two sections are randomly selected samples because the school assigned the 30 students in each class to the particular classroom rather than the researchers, (iv) all 60 students took the pre-

test, (v) the two teachers taught the same course over the Fall 2019 semester as they had been directed by the researchers (control = traditional; experimental = with the integration of ICT) to do, finally (vi) all 60 students took the post-test.

#### 4. Finding and Analysis

Multiple techniques were used for the analysis of the data gathered in this sequential mixed methods research study. Data collected from the completed surveys and semi-structured interviews were analyzed using qualitative techniques, whereas the tests of the students' tests were analyzed using quantitative techniques.

##### 4.1. Analysis of the Surveys

The first hypothesis was tested by analyzing the survey, which was developed using the Kabakci Yurdakul (2012) model. Each item on the scale denotes a different level of technological implementation (see Appendix E). Two to three items are dedicated to each level of technology implementation as follows: Items 1, 2, and 3 refer to Level 1/2, Items 4, 5, and 6 are associated with Level 3, Items 7, 8, and 9 relate to Level 4a/4b, and Items 10 and 11 are linked to Level 5/6. The score on each item was uploaded to SPSS to obtain the average raw score for each categorization level. The highest score and the equivalent high level were then recorded. Following that, a degree of ICT implementation was built for each teacher respondent using the LoTI Digital Age Survey to calculate key statements.

**Table (2): Examination of the first item: classroom management usage for ICT digital tools**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Daily ( 6 )	2	50	50	50
A few times a week ( 5 )	2	50	50	100
At least once a week ( 4 )	0	0	0	0
A few times a month ( 3 )	0	0	0	0
At least once a month ( 2 )	0	0	0	0
At least once a semester ( 1 )	0	0	0	0
Never ( 0 )	0	0	0	0
<b>Total</b>	<b>4</b>	<b>100</b>		

When asked if ICT, such as digital devices and resources, is used by teachers for classroom management and professional communication, Teachers B and C, 50% ( $f = 2$ ), stated they use ICT daily while teachers A and D, 50% ( $f = 2$ ), stated they use such tools a few times a week. This indicates that the instructors utilize ICT tools in the classroom and therefore possess Level 1 (awareness) of the LoTI digital age framework.

**Table (3): Examination of the second and third items: the impact of ICT tools on the reinforcement of specific content**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Daily ( 6 )	0	0	0	0
A few times a week ( 5 )	1	25	25	25
At least once a week ( 4 )	2	50	50	75
A few times a month ( 3 )	0	0	0	75
At least once a month ( 2 )	0	0	0	75
At least once a semester ( 1 )	1	25	25	100
Never ( 0 )	0	0	0	0
<b>Total</b>	<b>4</b>	<b>100</b>		

As described on Table 3, 50% ( $f = 2$ ) of the teacher respondents (A and B) stated they use technology tools and resources at least once a week to reinforce certain lower-order thinking skills. Teacher D, 25% ( $f = 1$ ), responded that she uses it a few times a week, and Teacher C 25% ( $f = 1$ ), stated she uses it at least once a semester. This indicates that 75% ( $f = 3$ ) achieved Level 2 (exploration).



**Table (4): Examination of the fourth item: the usage of ICT tools to emphasize higher-order thinking strategies**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Daily ( 6 )	0	0	0	0
A few times a week ( 5 )	2	50	50	50
At least once a week ( 4 )	0	0	0	50
A few times a month ( 3 )	0	0	0	50
At least once a month ( 2 )	1	25	25	75
At least once a semester ( 1 )	0	0	0	75
Never ( 0 )	1	25	25	100
<b>Total</b>	<b>4</b>	<b>100</b>		

Regarding the items related to whether teachers use ICT devices and resources in a safe and legal manner while carrying out teacher-directed tasks requiring higher-order processing skills, 50 % (f = 2) of the teachers (B and C) stated they do so a few times a week, teacher D, 25 % (f = 1) said at least once a week, and Teacher D, 25% (f = 1) said never. This indicates that 75% (f = 3) of instructors advanced to Level 3 (infusion) while one teacher remained at level 1 (awareness).

**Table (5): Examination of the fifth item: applying constructivism along with ICT tools**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Daily ( 6 )	0	0	0	0
A few times a week ( 5 )	1	25	25	25
At least once a week ( 4 )	0	0	0	25
A few times a month ( 3 )	0	0	0	25
At least once a month ( 2 )	0	0	0	25
At least once a semester ( 1 )	3	75	75	100
Never ( 0 )	0	0	0	100
<b>Total</b>	<b>4</b>	<b>100</b>		

When asked if they used a constructivist model of teaching with their students, Teacher B, 25% (f = 1) said she did so a few times a week while the rest 75% (f = 3) stated they did so at least once a semester. This demonstrates that only one of the teachers achieved Level 4a (implementation, routine), 50% (f = 2) stayed in level 3 (infusion), and 25% (f = 1) remained in level 1 (awareness).

**Table (6): Examination of the sixth item: using ICT tools for problem-based learning**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Daily ( 6 )	0	0	0	0
A few times a week ( 5 )	1	25	25	25
At least once a week ( 4 )	0	0	0	25
A few times a month ( 3 )	0	0	0	25
At least once a month ( 2 )	0	0	0	25
At least once a semester ( 1 )	3	75	75	100
Never ( 0 )	0	0	0	100
<b>Total</b>	<b>4</b>	<b>100</b>		

When asked if instructors ensure that their students use ICT resources to investigate real-world issues and solve realistic challenges at the highest cognitive levels, teacher B affirmed that she engaged in this practice a few times a week while the rest, 75% (f = 3), stated a frequency of at least once a semester. This indicates that 25% (f

= 1) attained level 4b (implementation, mechanical) and 75% (f = 3) remained at the same levels as illustrated in table 5.

**Table (7): Examination of the seventh item: creating authentic products through the use of ICT tools**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Daily ( 6 )	0	0	0	0
A few times a week ( 5 )	0	0	0	0
At least once a week ( 4 )	1	25	25	25
A few times a month ( 3 )	0	0	0	25
At least once a month ( 2 )	0	0	0	25
At least once a semester ( 1 )	1	25	25	50
Never ( 0 )	2	50	50	100
<b>Total</b>	<b>4</b>	<b>100</b>		

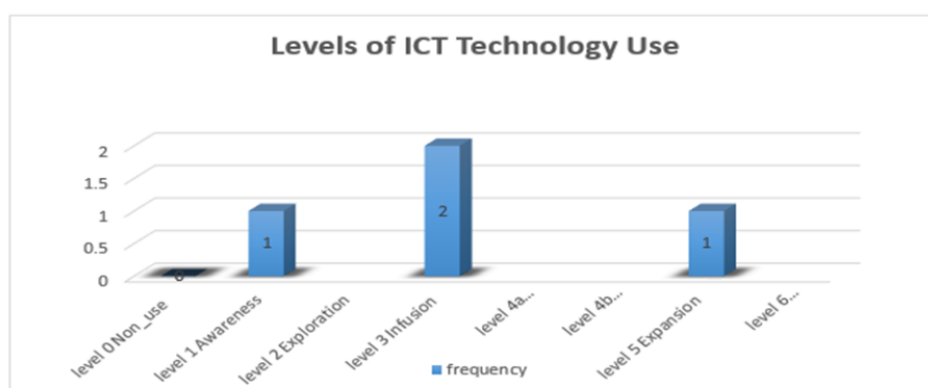
When asked if instructors ensured that their students used ICT and resources to develop authentic products that solved real-world issues via collaboration, Teachers A and D, 50% (f = 2), said they had never done so, Teacher C, 25% (f = 1) answered she did it at least once a semester, and Teacher D, 25% (f = 1), indicated she did it at least once a week. This suggests that 75% (f = 3) made no progress toward their levels and one achieved Level 5 (expansion).

**Table (8): Examination of the eighth and ninth items: reaching a professional stage while using ICT tools**

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Daily ( 6 )	0	0	0	0
A few times a week ( 5 )	0	0	0	0
At least once a week ( 4 )	0	0	0	0
A few times a month ( 3 )	0	0	0	0
At least once a month ( 2 )	0	0	0	0
At least once a semester ( 1 )	1	25	25	25
Never ( 0 )	3	75	75	100
<b>Total</b>	<b>4</b>	<b>100</b>		

When asked if teachers ensured that their students utilized ICT devices and resources to produce a professional-level product, Teachers A, C, and D /75% (f = 3) stated they had never done this, whereas the remaining one affirmed that she did this at least once a semester. This suggests that 100% (f = 4) of the teachers did not achieve the maximum level, level 6 (refinement), and instead remained at their indicated levels.

Following an analysis of the percentages representing the amount of ICT usage of the four English instructors at AlRafid School, the figure below classified the teachers into three levels, as indicated:



**Figure (1): Teachers' levels of ICT technology use.**

As can be seen in the figure above, most of the instructors were at the first three levels of ICT implementation (one teacher is at level 1—awareness while two are at level 3—infusion). These levels are distinguished by either no usage or use that facilitates lower-order cognitive goals. Only one teacher is at level 5 (expansion). According to the LoTI framework, at this level, most of the instructors mostly used ICT tools for presentation, upgrading lectures or slideshows, or curriculum administration duties such as collecting attendance, utilizing grade book applications, accessing emails, or downloading lesson plans. If students utilize ICT resources, it is frequently for varying reasons to the learning emphasis, such as an incentive, or to enhance lower cognitive processes such as drill and practice. After investigating this variable (teachers' level of ICT knowledge), it becomes clear that AlRafid school lacks concerns with policy, administration, and planning. This means that the preceding figure, as well as the observations of the independent variables, rejected the null hypothesis and demonstrated a lack of ICT resources, planning, and organizational challenges that negatively impact instructors' ICT levels.

Before continuing with the analysis, it was thought prudent to investigate the link between teachers' ICT implementation and their level of technological pedagogical and content understanding.

## 4.2. Interview Analysis

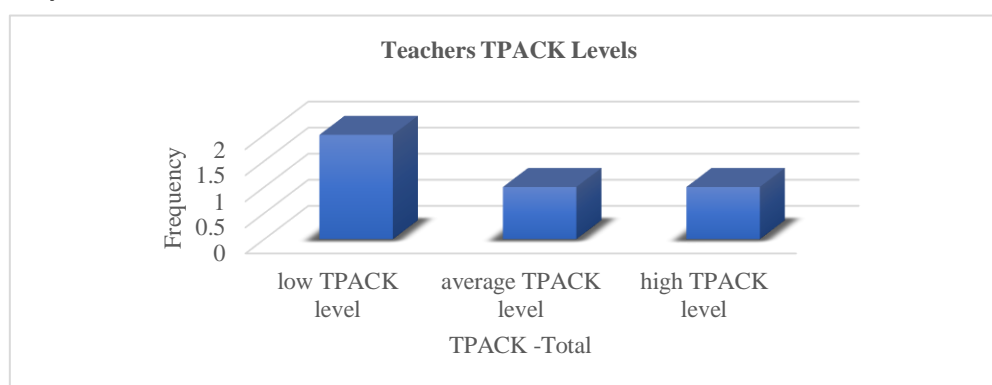


Figure (2): Teachers' TPACK Levels

The first section (part A) was focused on determining the TPACK level of the four English teachers. Teachers were required to affirm their competencies to the supplied issues by verbally stating: *I have much competence*, *I have moderated competence*, and *I have no competence*.

According to Figure (2), two of the teachers (A and D) had low TPACK levels, one had an average (Teacher C), and the fourth had a high TPACK level. This suggests that three out of every four English language instructors are unable to link content knowledge, pedagogical expertise, and technology knowledge. This is consistent with the findings of other researchers who have emphasized the need for effective training on activities linked to pedagogical content rather than simply having training sessions for teachers related to developing their abilities regarding how to use ICT in the classroom (Irwanto, 2021; Bowman et al., 2022; Putri et al., 2022). Furthermore, professional development content must meet the demands of teachers in their classrooms before making any modifications to their technology skills and knowledge.

According to the responses of the four English language instructors to parts B and C of the interview, teachers were categorized as follows: three instructors were identified as being in the first two stages, namely inaction and investigation while one teacher was in the application stage.

### 4.2.1. Teachers With Low Levels of LoTI and TPACK

Teacher A has 22 years of teaching experience and teaches Grade 10 Section A in English. She had, however, only 2 years of experience using ICT tools. She was classified as inactive since she had low levels of TPACK. She stated that her "computer skills are limited, and [she] has unfavorable experiences using ICT technologies." In her opinion, "the accessible ICT tools in the classroom may save time and effort but distract [students]." Because she is not trained to create PowerPoints, she relies on flashcards to provide graphics at the beginning of each class or at the conclusion as a kind of evaluation. She occasionally requested assistance in typing assignments and examinations, or in downloading an image from the Internet. She stated she was unwilling to expand her ICT abilities and preferred to follow the conventional teaching technique.

Teacher C is a high school English teacher who teaches Section C. She has 8 years of teaching experience but just 2 years with ICT. Her TPACK is at the inaction level. She stated:

*...I had not attended any ICT training sessions and I did not have access to the Internet at home. I brought my laptop to type the quizzes and additional worksheets. I prepared the lessons on flashcards at the start of my teaching career and was unwilling to adopt any teaching technique.*

This teacher just instructs pupils to complete their homework at home on their own and occasionally invites them to work in small groups or pairs to assess their progress in class. In terms of ICT, she stated that she would

not implement it since the administration did not require instructors to utilize ICT at work. She believes that “students currently spend most of their time on their tablets and allowing their usage inside classes will not encourage [her] students since they have become part of their lives.” She further confirmed that she believes her traditional method may be more efficient than methods that incorporate ICT.

#### 4.2.2. Teachers with a High Level of LoTI and TPACK

Teacher B is an English teacher who teaches section B and has 19 years of teaching experience. For nearly 5 years, she had been incorporating ICT into her teaching practices. Because of her high levels, she is characterized as being in the application stage. She is interested in “attending several seminars and training sessions to strengthen her digital skills.” Her classroom has a projector, which makes her work easier. She typically requests that her students work in pairs or small groups of four to produce PowerPoint presentations as an end-of-session evaluation or for speaking practice. Furthermore, she “recommends valuable websites for [her students] to visit to enhance their presentations.” She also regularly sends her students movies that are linked to the text via email. She believes these practices strengthen students’ talents and make them more focused learners. At the start of each lesson, “[She] prepares videos and slides relating to the class’s topic, and as she progresses through the text, she utilizes Kahoot to administer pop quizzes or revision exercises connected to her text as a type of evaluation.” She is eager to include new applications in her teaching tactics, such as Zoom and Google Classroom since she is anxious to do her best to improve her students’ academic performance.

#### 4.2.3. Teachers with Average Level of LoTI and TPACK

Teacher D is an English teacher who instructs Grade 10 Section D. She was at the investigation level due to her average TPACK scores but low ICT level. She has 7 years of teaching experience and 1 year of experience with the ICT tool Knowledge. She “has technical understanding but could not use a current teaching program.” She stated that she “rarely [takes] her laptop to class unless the educational supervisor [is] there.” She requested assistance from her students in connecting the computer to the projector. She made every effort to provide her students with a variety of tasks and evaluation tools, but only in the form of photocopied samples. She downloaded the materials from the Internet to her laptop and requested a library technician print them out for her. She occasionally made posters, cards with challenging exercises and questions to pique her students’ interest and keep them entertained. She stated that she does not assign work that would require her students to utilize digital devices at home because they may not be able to afford them. This teacher consistently encourages students to work in pairs after the session to produce posters at home. She asserts that “this traditional method of teaching is reliable and addresses the needs of all students.” As a result, instructors with ICT knowledge and TPACK proficiency play an important role in enhancing student success and motivation.

### 4.3 Writing Tests Analysis

Writing is a difficult skill for Grade 10 students to master, especially because they are expected to create logical and well-organized essays in many genres that express a well-defined point of view. Students in English language disciplines should achieve at least 16/33 to pass the writing section while the comprehension section is 48/80. The students’ writing is graded using the following criteria: organization /8, content /8, vocabulary /7, grammar /7, and mechanics /3. The initial exams were administered to both groups (experimental and control) at the start of the semester, and the final expository writing tests were provided to both groups at the end of the semester. As noted, SPSS (Version 25) was used to analyze the students’ graded papers.

**Table (8): Total average of the pre and post writing tests of the control group**

		Total Average Grade of the Pre- Test	Total Average Grade of the Post- Writing Test
N	Valid	30	30
	Missing	0	0
Mean		14.367	14.983
Median		13.000	13.750
Std. Deviation		4.8582	4.5627

A slight difference was found between both writing test scores of the control group students. The pre-writing test revealed a median of 13.000 (SD = 4.86), whereas the post-writing test showed 13.750 (SD = 4.56). This suggests that the students in the control group made less progress with their writing, thereby highlighting the idea that traditional teaching techniques might be less efficient for use in the teaching-learning process.

**Table (9): Total average of the pre and post-writing tests of the experimental group**

N	Total Average Grade of the Pre-Writing Test		Total Average Grade of the Post-Writing Test
	Valid	30	30
	Missing	0	0
Mean		14.717	16.433
Median		13.750	15.500
Std. Deviation		4.9631	4.3584

A significant change in the scores of the experimental group was observed, with the median before ICT implementation being 13.75 (SD = 4.96), whereas after the course was taught with technology integrated into the curriculum the total average of the post-writing test increased to 15.50 (SD = 4.36). This suggests that students in the experimental group showed significant improvement.

**Table (10): T-paired dependent sample test for the control group**

Paired Samples T-test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair1	Total Average Grade of the first Test – Total Average Grade of the final writing Test	-.6167	1.1573	.2113	- 1.0488	-.1845	- 2.919	29	.07

**Note:** Sig. (2-tailed) is the p-value to identify any significant change in the results obtained.

The sig. (2-tailed) is 0.7 after using the T-paired dependent test for control group students to compare the significant value of the pre and post-writing assessments. This suggests that there was a considerable change in the students' scores but not to the degree anticipated.

**Table (11): Independent sample test**

		Paired Samples T-Test							
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair1	Total Average Grade of the post writing Test - Total Average Grade of the final writing Test	-1.7167	1.7054	.3114	-2.3535	-1.0799	-5.513	29	.000

**Note:** Sig. (2-tailed) is the p-value used to examine any significant change in the outcomes.

The sig. (2-tailed) was .000 after applying the T-paired dependent test for the experimental group of students to compare the significant value of the pre and post-writing tests. This implies that not only did the experimental group of students score higher, but they showed significant improvement over their pre-writing.



Table (12): Calculating P-Value

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower Upper
Total Average Grade of final writing Test	Control students' scores on the final writing test	.023	.045	-1.259	58	.0213	-1.4500	1.1520	-3.7560	-.8560
	Experimental students' scores on the final writing test			-1.259	57.879	.0213	-1.4500	1.1520	-3.7561	-.8561

**Note:** Sig. is the P-value used in this study to measure the level of confidence in the obtained results. As the p-value is low, the statistical significance is high.

According to the findings shown above, students who learned via ICT implementation outperformed those who were instructed with traditional methods. An independent t-test at ( $p < 0.05$ ), which is 0.045 level of significance, found a significant difference in the post-test scores of students in the control and experimental groups. The t-test findings are statistically significant. This contradicts the null hypothesis, which asserts that using ICT in the classroom has no impact on the writing performance of Grade 10 students.

## 5. Conclusions

It was apparent throughout this study that there were both extrinsic and internal issues impeding the instructors' ability to fully apply the concepts of TPACK. Extrinsic variables were associated with the school to which they were assigned. One such external factor was the relative lower resources of the school at which the research was conducted, which has limited access to 21<sup>st</sup>-century technology. Another such external factor is that there are inadequate training sessions and workshops in the country on integrating the three components (content, pedagogy, and technology) into the educational process, as well as policy, management, and organizational challenges that impact teachers' ability to create integrated instruction that conforms with the concepts of TPACK. Intrinsic variables that emerged from the interviews were related to instructors' resistance to the integration of ICT and to making significant changes to their teaching approaches.

Despite these challenges, this study revealed the importance of incorporating ICT tools into the teaching process of L2 expository writing. High- and moderate-achieving students in the experimental group showed improvement based on their post-test results in terms of the professionalism of their writing. They progressed from the proficient stage to the strong and exemplary ones, and as a result, they became innovative writers. Moreover, the control group students exhibited significantly less improvement in their writing. Weak students in the control showed no substantial improvement in their L2 expository writing after completing the class; moderate and high achievers showed only slight improvement. Thus, our analysis of the post-test results validated the importance of the integration of ICT into the instruction of L2 expository writing.

Additionally, emphasizing the need to improve LoTI in the classroom may turn unmotivating, teacher-centered classrooms into compelling forums for student inquiry, leading to greater student achievement not just on regional examinations but also in terms of the greater likelihood of students achieving their full potential.

### 5.1. Limitations

While there is a certain degree of randomization in how a school assigns students to a particular section of a class, our student sample was not fully random and the study was implemented in only one type of class, meaning the impact of the practices of other teachers in other classes on the students involved in the research could not be determined. The population of students that attend the AlRafid school comes from a relatively homogenous community, which indicates that they might have a similar response to different instructional techniques based on shared culture whereas a more diverse student population might react differently to the same instructional practices. Moreover, this research was conducted at one school in one region of Lebanon, meaning our findings might not be generalizable to other regions of the country.

Furthermore, it is possible that the age group of the students was a factor in the degree of success of the experimental group because students of this age are more likely to be motivated by access to technology and more likely to be fairly tech-savvy, as compared to even their teachers. While enthusiasm on the part of study subjects regarding the structure of the study should be considered positive, in this case, it is possible that the enthusiasm of the students to work with technology might conflict with the teachers' lesser knowledge and resistance to embracing technology. Some of the four teachers surveyed and interviewed were insistent that modern technologies should not be incorporated into classroom activities. The primary reasons for this resistance were:

lack of technological knowledge, lack of time to organize the use of technological devices, and lack of technical assistance.

Moreover, the school has a population of students from relatively low-income households. In that scenario, it is possible that quite a few students might not have access to technology at home. This structure stigmatizes students who are less affluent because they have to publicly (in front of their peers) reveal that they are poorer than their peers and seek out someone with greater resources to collaborate with.

Another contributing aspect was the lack of online pedagogical training and progressive evaluation in the Lebanese curriculum. English language instructors wanted more than just ICT training; they sought to determine how to use what they learned in their subject areas. These three factors are critical for instructors to reach a high TPACK level, particularly for enhancing the teaching-learning process of their students' L2 expository writing.

The timing of this research is also an effective factor as it predated the pandemic but also occurred at a time of crisis in Lebanon due to wildfires and an economic crisis that reached a boiling point with citizens right at the start of the 2019-2020 school year (BBC News, 2019). This situation forced all Lebanese students in all educational institutions to take a break from their studies for several weeks, thus shortening the Fall semester, which is when we conducted the study.

## 5.2. Implications for Further Research

Since blended learning will be formally implemented in Lebanese public and private schools after the pandemic, it is critical to preserve educational quality by ensuring the right use of ICT equipment as well as the preparation of instructors with high LoTI and students likely. That is why educators are urging the Ministry of Education and Higher Education (MEHE) to enhance e-learning expenditures and establish departments to manage and monitor the growth of e-learning.

Lebanon is experiencing a serious economic crisis, which precludes the MEHE from providing ICT infrastructure (U.S. Agency for International Development [USAID], 2021) and guaranteeing safe and secure Internet connection to all public educational institutions. Seeking foreign funding for the educational sector, on the other hand, would be a major step toward ensuring good educational quality in Lebanon. In addition, there is an urgent need to develop specific departments comprised of professional and experienced leadership in the fields of technology and curriculum-based subjects to monitor and analyze suitable integration. Creating an accredited academic organization that monitors the development of distant learning standards and determines the features and profile of a classroom teaching session would be a positive step.

It is necessary to update e-learning platforms and make them more flexible and engaging. Moreover, added to this must be attention to the need for establishing virtual school options and providing the necessary legislation, qualifications, skill training, and technical equipment to assist instructors' integration of ICT technological devices and resources. Some current intriguing and useful platforms utilized as e-learning tools in Lebanese public schools are Kahoot, Google Classroom, Edmodo, Zoom, and Microsoft Teams.

It is critical to seek out new objectives and trustworthy ways of assessing students by implementing standards that promote transparency, honesty, and equitable opportunity. Furthermore, current programs and technologies must be used to create formative, diagnostic, and summative exams. To fulfill the demands of Lebanese learners, this issue necessitates a significant overhaul in the overall Lebanese curriculum.

Thus, teaching is a continuous process that requires continual growth, devotion, and tenacity on the part of instructors, who are responsible for bringing about successful change and who are critical components of the educational process. The TPACK construct emerged as a new dynamic framework developed for defining teachers' knowledge. Attending workshops, conferences, courses, and training sessions led by skillful and qualified academics in the field of education will benefit teachers' professional LoTI growth, making it easier for them to successfully integrate the three essential aspects of TPACK—technology, content, and pedagogy—into their teaching methods.

As a final note, innovative and engrossed teachers are the ones that can make real differences and changes in education.

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## Appendix A

## Survey: Teachers' Level of ICT Technology Use

Statements	6 Daily	5 A few times a week	4 At least once a week	3 A few times a month	2 At least once a month	1 At least once a semester	0 Never
The ICT digital tools and resources that are available in the classroom are utilized for classroom management and professional communication (e.g. grading students' work, accessing the internet, planning instructional activities).	6	5	4	3	2	1	0
The digital ICT tools and resources (e.g., Interactive Whiteboard, digital student response and online tutorials) are used by the teacher and students to supplement the curriculum and reinforce specific content.	6	5	4	3	2	1	0
I present the safe and legal use of ICT digital tools and resources while I am delivering content/reinforcing their understanding of appropriate concepts utilizing multimedia resources and tools (e.g., interactive Whiteboard, google presentations).	6	5	4	3	2	1	0
I assign web-based projects (e.g., web collaborations, Web Quests) to my students that emphasize complex thinking strategies (e.g., problem-solving, decision-making, experimental inquiry) aligned to the content standards.	6	5	4	3	2	1	0
My students use the classroom digital tools and resources to engage in, challenging, self-directed learning experiences that address the content standards.	6	5	4	3	2	1	0

Problem-based learning occurs in my classroom because it allows students to use the classroom digital tools and resources for higher-order thinking (e.g., analyzing, evaluating, creating) and personal inquiry.	6	5	4	3	2	1	0
My students apply their classroom content learning to real-world problems within the local or global community using the digital tools and resources at our disposal.	6	5	4	3	2	1	0
My students propose innovative ways to use our school's advanced digital tools (e.g., digital media authoring tools, graphics programs, probe ware with GPS systems) and resources (e.g., publishing software, media production software, advanced web design software) to address challenges/issues affecting their local and global communities.	6	5	4	3	2	1	0
My students use all forms of the most advanced digital tools (e.g., digital media authoring tools, graphics programs, probe ware with GPS systems, handheld devices) and resources (e.g., publishing software, media production software, advanced web design software) to pursue collaborative problem-solving opportunities surrounding issues of personal and/or social importance.	6	5	4	3	2	1	0



**Appendix B**  
Teachers' Interview

<b>Part A: Teachers' TPACK Measurement</b>				
<b>TPACK Scale</b>	<b>Statements</b>	<b>Much competence</b>	<b>No competence</b>	<b>Moderate competence</b>
	I can update instructional material (paper-based, electronic, or multimedia materials, etc.) based on the needs (students, environment, duration, etc.) by using technology.			
	I can use technology to determine students' needs related to a content area in the pre-teaching process.			
	I can use technology to develop activities based on student needs to enrich the learning process.			
	I can plan the teaching and learning process according to available technological resources.			
	I can develop appropriate assessment tools by using technology.			
	I can integrate effective classroom management in the teaching and learning process in which technology is used.			
	I can assess whether students have the appropriate content knowledge by using technology.			
	I can apply instructional approaches and methods appropriate to individual differences with the help of technology.			

	forum, chat, e-mail, etc.) in the teaching process.			
	I can act as an appropriate model for the students in following codes of ethics for the use of technology in my teaching.			
	I can act as an appropriate model for the students in following codes of ethics for the use of technology in my teaching.			
	I can guide students by leading them to valid and reliable digital sources.			
<b>Part B: INTEGRATION and USE</b>				
<b>Frequency of use</b>	Is there any pattern to your ICT usage? How often do your students use ICT? Do they work independently or in groups?			
<b>Integration strategies</b>	What teaching strategies have you used, and do you use them consistently where ICT is involved? How do you decide on the strategy you use?			
<b>Type of activities and pedagogy</b>	What activities have you used computers for in the last term?			
<b>Tasks for applications</b>	To what tasks have you applied computers during the last term? How have you determined those tasks?			
<b>Assessing student learning outcomes</b>	Have you assessed the work that students have done with ICT? How has this been included with your overall assessment processes?			
<b>Relevance of ICT to content</b>	In what ways do you connect what the students do with ICT and the way ICT is used in our society?			
<b>Part C: TEACHERS' ICT CAPABILITIES</b>				
<b>Understanding of potential uses</b>	What potential do you see for ICT to support learning and teaching processes in your class?			
<b>Roles of teachers and students</b>	What do you see as your main roles when using ICT with your classes? What roles do the students have?			
<b>Source of direction for use</b>	In what ways are students permitted to contribute to decisions about the use of ICT?			
<b>Concerns</b>	What concerns do you currently have about how ICT is used to support learning and teaching?			

### Appendix C

#### First Writing Test

Al Rafid Secondary School  
Duration: 90 minutes

First Year Secondary  
English First Writing Test

Name:

Part two: writing

Score:32

Topic: Not only can technology improve a person's life quality, but it can also rescue lives.

In a 250-300 word well –organized essay, explain this statement, supporting your ideas with enough facts and examples. After you narrow down the topic, see that the essay has a catchy introduction, an effective thesis statement, two or three body paragraphs with curiosity-rousing topic sentences, and a wrapping conclusion.

Here are some tips for help.

- Should show rather than merely tell.
- Should be enriched with two or four examples meant to illustrate the proposed ideas smartly and coherently.
- Should include transitional expressions such as for instance, for example, in particular, and as a case in point.
- Should not convey an argumentative tone.
- Should include some vivid images, lively figurative language, and precise word diction to make your points crystal clear.

## Appendix D

### Final Writing Test

Al Rafid Secondary School

First Year Secondary

Duration: 90minutes

English Final Writing Test

Name:

Part two: Writing

Topic: Many have eaten themselves to death, for obesity is unfortunately a dormant killer.

In a 250-300 word, well –organized, unified, coherent essay, explain this statement, highlighting the case of someone whose weight tipped the scales, elaborating on the effects of morbid obesity. After narrowing down the topic, see that the essay has a catch introduction, an effective thesis statement, two or three body paragraphs with curiosity-rousing topic sentences, and a wrapping conclusion.

Here are some tips:

- Should show rather than simply tell.
- Should clarify the given statement, saying, proverb, or quotation in the first body paragraph rather than in the introduction.
- Should be enriched with one extended example or an anecdote meant to illustrate the proposed idea smartly and coherently.
- Should build some dramatic tension or suspense where necessary to draw the audience's attention.
- Should include transitional signals, such as in particular, as a case in point, indeed, in fact, after, before, as soon as, and upon.
- Should present a conclusion with final impression, recommendation, or any other relevant, creative technique.

## Appendix E

### The LoTI Framework

Level	Description
Level 0-Nonuse	At a Level 0 (Non-Use), the instructional focus can range anywhere from a traditional direct instruction approach to a collaborative student-centred learning environment. The use of research-based best practices may or may not be evident, but those practices do not involve the use of digital tools and resources. The use of digital tools and resources in the classroom is non-existent due to (1) competing priorities (e.g., high stakes testing, highly-structured and rigid curriculum programs), (2) lack of access, or (3) a perception that their use is inappropriate for the instructional setting or student readiness levels. The use of instructional materials is predominately text-based (e.g., student handouts, worksheets).
Level 1-Awareness	At a Level 1 (Awareness), the instructional focus emphasizes information dissemination to students (e.g., lectures, teacher-created multimedia presentations) and supports the lecture/discussion approach to teaching. Teacher questioning and/or student learning typically focuses on lower cognitive skill development (e.g., knowledge, comprehension). Digital tools and resources are either (1) used by the classroom teacher for classroom and/or curriculum management tasks (e.g., taking attendance, using grade book programs, accessing email, retrieving lesson plans from a curriculum management system or the Internet), (2) used by the classroom teacher to embellish or enhance teacher lectures or presentations (e.g., multimedia presentations), and/or (3) used by students (usually unrelated to classroom instructional priorities) as a reward for prior work completed in class.
Level 2-Exploration	At a Level 2 (Exploration) the instructional focus emphasizes content understanding and supports mastery learning and direct instruction. Teacher questioning and/or student learning focuses on lower levels of student cognitive processing (e.g., knowledge, comprehension) using the available digital assets. Digital tools and resources are used by students for extension activities, enrichment exercises, or information gathering assignments that generally reinforce lower cognitive skill development relating to the content under investigation. There is a pervasive use of student multimedia products, allowing students to present their content understanding in a digital format that may or may not reach beyond the classroom.
Level 3-Infusion	At a Level 3 (Infusion), the instructional focus emphasizes student higher order thinking (i.e., application, analysis, synthesis, evaluation) and engaged learning. Though specific learning activities may or may not be perceived as authentic by the student, instructional emphasis is, nonetheless, placed on higher levels of cognitive processing and in-depth treatment of the content using a variety of thinking skill strategies (e.g., problem-solving, decision-making, reflective thinking, experimentation, scientific inquiry). Teacher-centered strategies including the concept attainment, inductive thinking, and scientific inquiry models of teaching are the norm and guide the types of products generated by students using the available digital assets. Digital tools and resources are used by students to carry out teacher-directed tasks that emphasize higher levels of student cognitive processing relating to the content under investigation.
Level 4a-Implementation (Mechanical)	At a Level 4a (Implementation: Mechanical) students are engaged in exploring real-world issues and solving authentic problems using digital tools and resources; however, the teacher may experience classroom management (e.g., disciplinary problems, Internet delays) or school climate issues (lack of support from colleagues) that restrict full-scale implementation. Heavy reliance is placed on pre-packaged materials and/or outside resources (e.g., assistance from other colleagues), and/or interventions (e.g., professional development workshops) that aid the teacher in sustaining engaged student problem-solving. Emphasis is placed on applied learning and the constructivist, problem-based models of teaching that require higher levels of student cognitive processing and in-depth examination of the content. Students use of digital tools and resources is inherent and motivated by

	the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience.
Level 4b- Implementation (Routine)	At a Level 4b (Implementation: Routine) students are fully engaged in exploring real-world issues and solving authentic problems using digital tools and resources. The teacher is within his/her comfort level with promoting an inquiry-based model of teaching that involves students applying their learning to the real world. Emphasis is placed on learner-centred strategies that promote personal goal setting and self-monitoring, student action, and issues resolution that require higher levels of student cognitive processing and in-depth examination of the content. Students use of digital tools and resources is inherent and motivated by the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience.
Level 5- Expansion	At a Level 5 (Expansion), collaborations extending beyond the classroom are employed for authentic student problem-solving and issues resolution. Emphasis is placed on learner-centred strategies that promote personal goal setting and self-monitoring, student action, and collaborations with other diverse groups (e.g., another school, different cultures, business establishments, governmental agencies) using the available digital assets. Students' use of digital tools and resources is inherent and motivated by the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience. The complexity and sophistication of the digital resources and collaboration tools used in the learning environment are now commensurate with (1) the diversity, inventiveness, and spontaneity of the teacher's experiential-based approach to teaching and learning and (2) the students' level of complex thinking (e.g., analysis, synthesis, evaluation) and in-depth understanding of the content experienced in the classroom.
Level 6- Refinement	At a Level 6 (Refinement), collaborations extending beyond the classroom that promote authentic student problem-solving and issues resolution are the norm. The instructional curriculum is entirely learner-based. The content emerges based on the needs of the learner according to his/her interests, needs, and/or aspirations and is supported by unlimited access to the most current digital applications and infrastructure available. At this level, there is no longer a division between instruction and digital tools/resources in the learning environment. The pervasive use of and access to advanced digital tools and resources provides a seamless medium for information queries, creative problem-solving, student reflection, and/or product development. Students have ready access to and a complete understanding of a vast array of collaboration tools and related resources to accomplish any particular task.