

# The Effectiveness of Digital Transformation of Learning on Students' Learning Experience, Students' Engagement, and Perceived Intellectual Competence: A Mixed-Method Approach

By

محمد مصطفى عليوة

Mohamed Mostafa Eliwa

Faculty of Education, Zagazig University, Egypt

## Abstract

This paper studied the digital transformation of learning on perceived intellectual competence, students' engagement, and learning experience, 387 students in their first year of high school, were involved, besides eight teachers from different schools. Using a mixed research method; The students took part in a survey using the OLSES scale consisting of twenty-two items: learning in the online environment (10), time management (5), and technology use (7). The study also used the Learning Object Evaluation Scale for Teachers (LOES-T) and 5-point Likert scales to examine the teachers' views on students' engagement with web-based learning tools. On the other hand, the qualitative study involved an interview through the Interwise web conferencing tool. A descriptive analysis of the OLSES and LOES-T scale scores and notes from the interviews revealed three themes: (1) perception of students' academic experience, (2) perceptions on self-efficacy and self-regulation, and (3) perceptions on students' engagement. The students agreed that using the Internet in after-school learning activities makes them feel more knowledgeable and confident about applying their knowledge to solve problems within and outside the classroom, resulting in high academic success. The teachers also concluded that the digital learning environment improves students' engagement as they regularly interact with web-based learning tools and are motivated to share their knowledge.

**Keywords:** Perceived intellectual competence, perceived self-efficacy, digitized learning, learning capabilities, self-regulation.

**مستخلص البحث :**

إن الهدف الرئيس من البحث هو الكشف عن تأثير الانتقال الرقمي للتعليم على الكفاءة المعرفية المدركة والاندماج المدرسي وخبرة التعلم لدى تلاميذ الصف الأول الثانوي، ولتحقيق أهداف البحث؛ قد شارك (٣٨٧) تلميذاً، بالإضافة إلى (٨) معلمين مختصين من مدارس مختلفة. وباستخدام منهج البحث المختلط الذي تضمنت أدواته: مقياس "فعالية الذات للتعلم عبر الإنترنت OLSSES" الذي تكون من (٢٢) مفردة موزعة على ثلاثة أبعاد: التعلم في بيئة الإنترنت، وإدارة الوقت، واستخدام التكنولوجيا، والذي تم تدعيمه بأسلوب المقابلات مع المعلمين المختصين لضمان تحقيق الأسلوب المختلط بين الكمي والكيفي وتمت المقابلات معهم باستخدام أدوات التواصل عبر الإنترنت، هذا بالإضافة إلى مقياس "تقويم عناصر التعلم للمعلمين LOES-T"، وأخيراً مقياس ليكرت خماسي لقياس اندماج التلاميذ المدرسي من وجهة نظر المعلمين عند استخدام أدوات التعلم عبر شبكة الإنترنت. وتم إجراء التحليلات الإحصائية والمتقدمة للمقاييس، وكشف التحليل الكيفي لمقابلات المعلمين عن ثلاث موضوعات رئيسة Themes هي: ١-التصور عن الخبرة الأكاديمية للتلاميذ، ٢-تصورات حول فعالية الذات والتنظيم الذاتي، ٣-تصورات حول الاندماج المدرسي للتلاميذ. وتمثلت أبرز النتائج في ارتفاع نسبة اتفاق التلاميذ في أن استخدام الإنترنت في أنشطة التعلم بعد المدرسة يجعلهم يشعرون بمزيد من المعرفة والثقة بشأن تطبيق معرفتهم لحل المشكلات داخل وخارج الفصل، مما يؤدي إلى نجاح وكفاءة أكاديمية عالية. كما خلص المعلمون إلى أن بيئة التعلم الرقمية تعمل على تحسين اندماج التلاميذ حيث يتفاعلون بانتظام مع أدوات التعلم القائمة على الويب ولديهم الحافز لمشاركة معارفهم.

الكلمات المفتاحية: الكفاءة المعرفية المدركة؛ فعالية الذات المدركة، الانتقال الرقمي للتعلم، الاندماج الطلابي المدرسي، خبرة التعلم، المنهج المختلط.

## 1. Introduction

### 1.1. Background Information

Technological advancement has allowed more efficient approaches to education, learning, and course creation to be developed. Technological advances over the past twenty years have included combining technology and education to enhance the learning experiences of students at all levels of education, according to Balyer and Oz (2018).

Using computers and mobile devices, they can access the Internet easily. In a wide variety of fields, the quest for understanding has provided greater opportunities for learners to gain the knowledge they need to solve real-world problems and their problems throughout the learning process (Di Giacomo et al., 2017, p. 1329).

The presence of the right digital framework, which integrates various elements of the ecosystem, enables the study of elements that allow learners to understand the interconnected nature of learning at all levels, including individual organizational and network learning (Camarda & Hietala, 2016, p.8).

Bond et al. (2018) consider the growth of Information and Communication Technologies (ICT) skills as one of the fundamental factors leading to the involvement of students in providing solutions to the critical problems of society (p.48).

However, while the principle of teamwork in learning and problem-solving, as explained earlier, is crucial in the new digital era, it can affect the academic output of a learner. This paper sheds light on the digitalization of learning as one of the important components of the 21st century and the usefulness of the perceived intellectual competence of students.

### 1.2. Statement of the Problem

While technology has played a significant role in improving the learning process, it may also directly influence the learners' intellectual competence. Camarda and Hietala (2016, p.7) mention

that digitization has changed the learning process from one that focused on the 'know-how' and 'know-what' to a process where students are more interested in their skills to search and select the internet sources with the right information. The learners' ability to search and curate information available on the Internet is vital in autonomous learning. According to Blasco-Arcas et al. (2013), the digital learning environment integrates different learning concepts, thus creating an opportunity for individual students to acquire knowledge on any desired subject (p.103). Moreover, students can use the vast information available on the Internet to solve problems in diverse fields that may interest them.

Bennett and Maton (2010) allude to the multidimensional phenomenon created by technological advancement, which encompasses students' behavioral, cognitive, and affective components of the learning experience (p.323). Due to the digitalization of learning, students can interact with each other, acquire information from a wide range of online sources, explore their abilities in content creation and share their views and information on the virtual platforms. As a result, most students perceive themselves as more empowered by their learning experience in the digital environment, making them believe that they are better learners than people from the pre-digitized generation (Kolikant, 2010, p.1384). Students' views on how the technology has influenced their ability to learn while presenting the need to address the same with a focus on learners' perceived intellectual competence is an area that needs a thorough analysis. Besides, the teachers' input on the impact of technological advancement would add crucial insight into the already existing knowledge.

intensive use of digital technology, students can now produce solutions to real-life problems, leading to the enhancement of their self-belief regarding their learning capabilities and academic achievements. The present study delves into the self-focused aspect resulting from the perception of intellectual competence among the students. The researcher seeks to understand whether the students' perception regarding their learning capabilities is influenced by digitized learning. Moreover, the study involves teachers to provide

more insight into the influence of students' engagement due to their use of web-based learning tools. By the end of this research paper, the study should determine whether learners think that they have enhanced mental abilities, knowledge, and ranking skills primarily due to their affinity to the Internet and teachers' views on the influence of the digital environment on students' engagement.

### **1.3. Aim**

This research aims to assess the effectiveness of digital transformation of learning on the learners' perceived intellectual competence.

### **1.4. Objectives**

The specific objectives that will guide this particular investigation are as listed below:

- To determine how digitized learning contributes to learners' perceived mental abilities, such as problem-solving.
- To examine how students' perceived knowledge and ranking skills, such as amount-known and speaking abilities, are influenced by the digital transformation of learning.
- To examine students' beliefs on how the Internet has influenced their learning abilities.
- To determine teachers' perceptions of students' online engagement.

### **1.5. Purpose and Significance of the Research**

This research delves into students' perception of their learning abilities and intellectual competence, as influenced by digitized learning. The paper acknowledges that the Internet is a vital tool in students' learning experience in the twenty-first century. It provides vast information and knowledge concepts that can be used to solve real-world problems. The research explores the idea of the Collaboratory approach to assessing the integration between the collaborative digital environment and learners' efforts to acquire knowledge and expertise in diverse areas through active inquiry (Osman et al., 2011, p.546). The Collaboratory, in this case, alludes that the digital transformation of learning has encouraged extensive

information-sharing among students, teachers, and the general population in the twenty-first century, resulting in a significant change in the students' learning experience as it entails using technological means to explore, express and exchange ideas (Kolikant, 2010, p.1384). The findings will be useful to teachers across all levels and other professionals responsible for learning and development in organizations in the Arabic region and other parts of the world. It addresses the concern about the dependency on the Internet by students during their learning experience. The research will also close the existing gap as it relies on students' precise information on their beliefs about how the Internet impacts their ability to learn.

### 1.6. Research Questions

1. How has the digital environment impacted individual learning experiences in the twenty-first century?
2. What are students' self-perceptions regarding the influence of the use of the Internet on their learning capabilities?
3. How do students relate their mental abilities, knowledge, and ranking skills to the use of the Internet?
4. What is the influence of the digital learning environment on students' engagement?

### 1.7. Research Hypotheses

The testable hypotheses for this particular research are as listed below;

- $H_1$ : There is a significant effect for the digital transformation of learning on students' learning experience.
- $H_2$ : There are significant effects for students perceiving the use of the Internet on their learning capabilities.
- $H_4$ : There are significant correlations between the use of the Internet for learning with their mental abilities, knowledge, and ranking skills.
- $H_4$ : The digital learning environment does not enhance the learning engagement of the student.

## 2. Review of Literature

### 2.1. Influence of Technology on Academic Learning Experience

Technology is one of the essential tools in education in the twenty-first century. According to Ghavifekr and Rosdy (2015), integrating technology and education has changed the way people think as it involves incorporating computer-based communication into the classroom instructional process (p.176). The study by Ghavifekr and Rosdy (2015) assesses the significance of Information, Communication, and Technology (ICT) in education as it seeks to replace the traditional learning process and the students' perception of technology-based learning (p.175). Based on the data obtained through a survey questionnaire, the study concludes that ICT has positively contributed to students' learning experiences as the digitized lessons are more exciting and engaging than the traditional setup (Ghavifekr & Rosdy, 2015, p.175). Zhang (2013) agrees that students develop better communication skills and higher confidence through digitized learning as they are equipped with information from a wide range of sources (p.48). The study suggests that digitized learning positively affects students' attitudes as they are more motivated to explore sources that may not be available to them in the classroom. The learners also perceive themselves as more imaginative and creative as the constant use of the Internet in the learning process expands their knowledge paradigm (Zhang, 2013, p.48). However, Zhang (2013) argues the nature of the digital learning environment may make students overconfident about their learning capabilities (p.50).

### 2.2. Effect of Digitized Learning on Students' Self-Efficacy

In line with the studies by Ghavifekr and Rosdy (2015) and Zhang (2013), Shen (2018) regard the digital environment as a significant contributing factor to students' academic success and self-efficacy. The study involving over five hundred students establishes that learners can be categorized into four groups based on their use of the Internet to facilitate learning: instrumental internet information seekers, multiple-styles internet information seekers, executive

information seekers, and unclear-styles internet information seekers (Shen, 2018). While the four groups all benefit from digitized learning, Shen (2018) argues that school-related internet information-seeking results in a higher level of academic self-efficacy. Zhu et al. (2011) agree that there is a close link between learners' information-seeking activities in the digital environment and self-efficacy.

Following the survey data obtained from vocational secondary school students, Zhu et al. (2011) conclude that using the Internet in the learning process results in the students' belief that they can successfully perform any given task, hence a high academic self-efficacy. Tsai et al. (2011) also add a positive correlation between learners' use of digitized learning and their self-efficacy regarding their academic capabilities and performance. According to Tsai et al. (2011), students who seek knowledge in a wide range of fields over the Internet are more confident in their skills and abilities to transfer the knowledge to the classroom and achieve more positive outcomes. Shen (2018), Zhu et al. (2011), and Tsai et al. (2011) agree that the digital transformation of learning has resulted in advanced information search strategies that improve individual learners' knowledge in a variety of subjects, resulting in increased students' perceptions of the ability to succeed in any academic task.

According to Chang et al. (2014), the high self-efficacy associated with digitized learning among students influences their academic performance. Moreover, the students feel more motivated to channel their motivation into the achievement of their learning objectives. The study examine the relationship between digitized learning and academic self-efficacy through the social cognitive theory. Based on the quantitative analysis involving eighty-seven college students, Chang et al. (2014) conclude that students who frequently use the Internet to boost their learning experience have a high self-efficacy and tend to outperform those with low internet self-efficacy. The former are also more confident in their ability to tackle academic tasks and have higher exam scores due to the knowledge acquired from online discussions and internet-based information search models (Chang et al., 2014).



In agreement with Chang et al. (2014), Yimaz (2016) uses the term 'blended learning method' to describe the internet-based learning process brought about by the digital transformation of learning. While adding to the study findings by Chang et al. (2014), Yimaz (2016) delves into the relationship between students' academic self-efficacy, knowledge-sharing behaviors, and community sense. According to the study, digitized learning has created a sense of community among individuals from diverse settings, resulting in an opportunity for students to share extensive knowledge of a wide range of subjects. Yimaz (2016) concluded that knowledge-sharing behaviors among students and the sense of community resulting from the digital transformation of learning lead to high levels of connectedness and learning, which, in turn, positively influence their academic self-efficacy.

Most students have positive attitudes towards learning and are highly motivated to achieve their learning objectives. This is as concluded in a study by Yang (2012), which assesses students' attitudes and self-efficacy when using the Internet and mobile learning devices in learning. Following the data obtained from interviews with college students, Yang (2012) concludes that the digital learning environment and extensive use of mobile devices create limitless opportunities for learners to engage in collaborative learning. The possibility of relating information available on the Internet to textbook knowledge positively influences the students' perceptions of their attitudes and self-efficacy, hence the increased belief of their intellectual competence being enhanced by internet-based learning (Yang, 2012). In line with these findings, The et al. (2010) attribute the collaborative learning characteristic of the digital learning environment to a high degree of collectivism, enabling students from all parts of the globe to acquire and share knowledge.

Based on the findings of the analysis by The et al. (2010), knowledge-sharing behaviors among students impact their intrinsic and extrinsic behavior, resulting in high self-efficacy. Similar to the argument by Yang (2012) and The et al. (2010), Shen et al. (2013) relate the digitization of learning to a community-centric environment that allows students to interact with other students socially and

instructors online while retrieving information to enhance the textbook knowledge. Based on an exploratory factor analysis, Shen et al. (2013) conclude that digitized learning significantly contributes to individual learners' academic satisfaction and self-efficacy. They are more confident about their abilities to use the Internet's knowledge to improve their learning outcomes.

### 2.3. Influence of Digitized Learning on Students' Self-Regulation

In a separate study, Valencia-Vallejo et al. (2018) suggest that digitized learning encourages self-regulation learning behavior among students, which, in turn, contributes to their self-efficacy, learning achievement, and cognitive style. Valencia-Vallejo et al. (2018) regard cognitive style and academic self-efficacy as the two major psychological characteristics of web-based interactions during the digitized learning process. According to Valencia-Vallejo et al. (2018), the digital learning environment is associated with the concept of scaffolding whereby students receive support from a community of learners who avail knowledgeable information online, making it easier to acquire information that may not be obtained without online assistance.

Valencia-Vallejo et al. (2018) argue that scaffoldings promote self-regulated learning in vast knowledge domains which favor self-efficacy development. Valencia-Vallejo et al. (2018) conclude that the element of computational scaffolding in digitized learning contributes to students' field-independent learning, which, in turn, makes them more persistent and optimistic about attaining their self-imposed academic objectives. The relationship between digital learning, self-regulation, and self-efficacy is further examined by Lavasani et al. (2011) in a study involving the test of an experimental group using motivated strategies for learning questionnaire (MSLQ). Based on the study findings, the digitization of learning promotes self-regulation strategies that directly influence learners' motivation and academic self-efficacy. The results suggest that students who have mastered self-regulation strategies have a close relationship with their self-efficacy and are more motivated to work towards their academic development (Lavasani et al., 2011).

Kuo et al. (2014) examine the effect of the digital learning environment and students' online activities on their self-efficacy and

satisfaction levels. The study suggests that learners who frequently use the Internet to facilitate their learning experiences are highly confident in obtaining data to solve classroom-based and real-world problems. As concluded by Kuo et al. (2014), the improved information searching skills among students gives them access to more content, resulting in positive attitudes towards their learning experience and a sense of competence to perform any academic tasks assigned to them. Yokoyama (2019) adds to the argument by Kuo et al. (2014) by suggesting that individuals can strengthen self-efficacy through mastery and social persuasion, both of which can be achieved in the online environment. Based on the study, learners who seek additional information on the Internet are more motivated to learn as they interact with different learners from various fields, making it easier for them to acquire the knowledge they need to achieve their academic objectives. Yokoyama (2019) links the study findings to Bandura's social cognitive theory related to human beings' beliefs about accomplishing a specific task.

Rodriguez and Armellini (2017) mention that individuals with a high level of self-efficacy or perceived intellectual competence are confident in their abilities to achieve their academic goals, self-regulate, need minimal guidance and supervision, and have the zeal to succeed despite the difficulties. According to the analysis of the results of a massive open online course, Rodriguez and Armellini (2017) conclude that the Internet has contributed to the development of students' academic confidence and metacognition, making them work towards better achievement academic results. While agreeing with Rodriguez and Armellini (2017), Taipjutorus et al. (2012) introduce learner control as one of the concepts associated with the digital learning environment and a factor in achieving high self-efficacy. Taipjutorus et al. (2012) use the theory of transactional distance and the concept of transactional control to demonstrate how learner control enhances the results of the learning process. The study associates digitized learning with a high learner control as students choose when, where, how, and what to learn. As agreed by the researchers, the significant control over one's learning process enhances the individual's learning and attitude, resulting in a high self-belief in their intellectual competence.

## 2.4. Influence of the Digital Learning Environment on Students' Engagement

Louwrens and Hartnett (2015) suggest that student engagement involves three primary constructs: emotional, cognitive, and behavioral engagement. According to the study, the Internet's influence on students' behavioral engagement is evident in their learning efforts to meet teachers' expectations, cognitive engagement involves their effort to understand complex concepts through extensive research, and emotional engagement involves the increased interest and positive attitude towards learning (Louwrens & Hartnett, 2015). While Dixson (2010) agrees with Louwrens and Hartnett (2015), the study argues that students who use the Internet to facilitate learning are more engaged than those who use traditional learning approaches. Dixson's (2010) argument is based on the multiple communication channels in the online learning environment, which facilitate student-student and student-instructor communication, resulting in higher student engagement. For this reason, Dixson (2010) suggests that teachers should use multiple communication channels to foster student interactions while making them comfortable enough to share knowledge.

In agreement with Louwrens and Hartnett (2015), Gibbs and Poskitt (2010) argue that students have to be emotionally and behaviorally engaged before being cognitively engaged. The study suggests that the social presence in a digital learning environment helps the learners feel more connected to one another, resulting in a collaboration that increases overall engagement. Barbour and Bennet (2013) add that the Internet has made it easier for students to build strong online relationships and establish a form of connectedness. As a result, the students feel comfortable to engage with each other and share knowledge within and outside the online learning environment. As concluded by Barbour and Bennet (2013), the establishment of cognitive presence relies on collaboration and interaction, leading to increased student engagement.

### 3. Methodology

This mixed-method research investigates the effectiveness of the digital transformation of learning on perceived intellectual competence. The research expounds on the link between technology and education while understanding learners' and teachers' beliefs about how the Internet influences students' learning capabilities.

#### 3.1. Research Philosophy

The research follows the interpretivism paradigm as the methods used to obtain data aim to provide knowledge with a personal interpretation of real-world events (Pham, 2018). This paradigm suits this study as it enables the researcher to view the world and different phenomena from the individuals' subjective experiences. This research philosophy will provide individual students' perspectives of their self-efficacy or perceived intellectual competence and teachers' perspectives of the students' online engagement.

#### 3.2. Research Design

The study adopts the quantitative research design to explain the correlation between two variables: digital transformation of learning and students' perceived intellectual competence. In addition, the study chose the descriptive exploratory research approach as it provides a better understanding of the study subject by answering the questions "why" and "how" (Reiter, 2013). The present study findings contribute to current studies as the study's evidence reveals new insights into the relationship between the variables.

#### 3.3. Research Approach

Data were analyzed using the inductive approach, whereby the study identified patterns from gathered information to answer the research questions. The research approach's choice was meant to enable the researcher to view the study topic from a detailed observation while identifying the relationships between the key variables. Eventually, explanations were developed from the identified patterns, leading to achieving the study aims and objectives

### 3.4. Participants

The choice of data collection methods used for this research was guided by the study's purpose and the need to understand individual participants' views while yielding the best results. The sample population comprised 387 students in their first year of high school and eight teachers from different secondary schools in Egypt. Information on the study's purpose and the aim was provided online. The interested individuals submitted their letters of interest with their personal information to the researcher's e-mail address. The information provided by the interested students included their gender, grade level, years of using computers, and whether or not they owned a personal computer. Teachers provided information on their gender and years of experience in the present secondary schools. Only students in their first year of high school and teachers with at least five years' experience were included in the study. After the selection process, 212 male and 175 female students, and three male and five female teachers were chosen to participate in the study. A summary of the students' and teachers' demographic information is presented in Table 1 and Table 2, respectively.

**Table 1**  
*Students' Demographic Information*

Variable	Frequency	Percentage
Study Participants:		
Male	212	54.78%
Female	175	45.22%
Grade Level: Freshman Year	387	100%
Years of Using a Computer:		
Less than 5 Years	53	13.70%
Above 5 Years	334	86.30%
Own a Personal Computer:		
Yes	360	93%
No	27	7%

**Table 2**  
*Teachers' Demographic Information*

Variable	Frequency	Percentage
Study Participants:		
Male	3	37.50%
Female	5	62.50%
Years of Experience:		
Five years	2	25%
6 – 10 years	4	75%

## Data Collection Procedure

### 3.4.1. Quantitative Data

Quantitative data was obtained using the Online Learning Self-Efficacy Scale (OLSES) and supported by qualitative data through interviews. The OLSES scale assessed the participants' beliefs on their capabilities to succeed in academic-related tasks. The OLSES scale has twenty-two items: learning in the online environment (10), time management (5), and technology use (7). The OLSES scale is also reliable as it provides results that conform to the rapidly changing digital learning technologies, hence the accuracy of the results (Zimmerman & Kulikowich, 2016). Considering that the interactions between the researcher and the study participants took place online, it would be easier to use the OLSES scale in an online questionnaire. The questions were based on the students' computer self-efficacy, information-seeking self-efficacy, internet self-efficacy, and problem-solving self-efficacy. 5-point Likert scales were used to examine the teachers' views on students' engagement with web-based learning tools, focusing on student engagement construct. Data from teachers was also obtained using the Learning Object Evaluation Scale for Teachers (LOES-T), as shown in Table 3.

**Table 3**

***Learning Object Evaluation Scale for Teachers***

	Disagree entirely (1)	Disagree (2)	Undecided (3)	Agree (4)	Agree entirely (5)
<i>Engagement</i>					
1. The students frequently interact with the web-based learning tools.					
2. The outcomes of after-school assignments show the extensive use of the Internet.					
3. Students are more motivated when using the Internet as a learning tool.					
4. Students are more engaged in helping each other accomplish tasks.					

**3.4.2. Qualitative Data**

The quantitative data obtained using the OLSES and LOES-T scales was supported by qualitative data gathered from online interviews through the Interwise software. The Interwise software facilitated real-time interviews with the participants, making it the best tool for the study. The first question during the interview during the students' interview was based on how they completed their after-school assignments, mainly why and how they used the Internet. The second question involved the students' perception of the Internet's



influence on their learning abilities and overall intellectual competence. Interviews with the teachers focused on their views on students' use of the Internet and their perception of online student engagement. The discussions with all the study participants were recorded and saved for analysis.

### 3.5. Data Analysis

The study adopted "Factor Loading" in the item analysis of the OLSES and LOES-T questionnaires. The analysis provided an insight into the structure of the factors as the researcher was able to discriminate the relationship between the individual scale items. Using the factor loading led to the extraction of the common factor, which had to be  $\geq 40$ , as recommended by Zimmerman and Kulikowich (2016). The study adopted the exploratory factor analysis, the oblimin rotation technique, and the principal component analysis. The analyses facilitated the examination of the twenty-two items of the OLSES scale factors and the factor loadings of the LOES-T. The scores of the 5-point Likert Scale were coded between 1 and 5: (1) disagree entirely; (2) disagree (3) Undecided; (4) agree; (5) agree entirely. This helped determine the students' perception of intellectual competence and teachers' views on students' online engagement. The study performed a Kaiser-Meyer-Olkin (KMO) test to assess the suitability of data and adequacy of the sampling. The KMO test revealed a sampling adequacy of 60% and a value of .981, an adequate level of sampling adequacy, hence the validity of the results.

The process of analyzing data from the video recordings involved transcription and the process of note-taking. The transcripts were marked up to identify the keywords used by the participants to answer the interview questions. There was more emphasis on repetitions as they identified patterns that created the themes of the study. The study focused on cognitive, behavioral, and emotional engagement while examining the data. Cognitive engagement was revealed by how the teachers and students responded to each other. Behavioral engagement involved the respondents' participation in the activities during the forum, and emotional engagement was evident in how the participants identified with the activity. Relevant themes and patterns

emerged following the inductive approach. Three themes emerged from the analysis: (1) perceptions on the Internet; (2) Students' perception of books regarding their learning capabilities; and (3) perceptions on students' engagement.

### 3.6. Reliability

This paper follows the definition by Guest et al. (2012), who view reliability as the recurrence of the measurements and results of a particular study when the same research is carried out in varying contexts and occasions. This definition of reliability is mostly applicable to quantitative research. If the research takes a qualitative approach, consistency is the metric used to ensure reliability. In this research, reliability was ensured via verification of the study's collected data to ensure slight modifications accurately follow them. The data was then updated following the participants' feedback and was further cross-checked to ensure consistency.

The quantitative analysis utilized was extensive, making use of appropriate quantitative elements to ensure reliability. For instance, as part of the reliability test, the study examined the internal consistency of the OLSES scale items, Cronbach's alpha. The analysis led to a Cronbach's coefficient of .987, implying that the model used had achieved stability hence the high reliability of the obtained outcome. The analysis revealed that the scales' scores and overall findings were highly reliable. The use of range instead of standard deviation and the 5-scale Likert scale also ensured straightforward interpretation of the study findings.

Providing the participants with a copy of the transcriptions for review helped verify data accuracy, thus increasing reliability. The study then verified the participants' responses and made relevant changes. Moreover, the transcribing process involved an experienced transcriptionist who helped assess the validity of the decoded information. Data was updated following the participants' feedback and was further cross-checked to ensure consistency. The data used to derive the study findings reflected the participants' experiences and perspectives provided through the online data collection processes.

### 3.7. Validity

In research, validity refers to the suitability of the research process, collected data, and the tools that have been employed. In ensuring the validity of the investigation, the formulated research question should fetch desirable results. The method selected for conducting the survey should be appropriate in fetching responses to the research questions. The other considerations in ensuring validity include the appropriateness of data analysis and the sampling method, research design, results, and draw inferences concerning the selected sample. For this particular research, real research questions were formulated to test feasible hypotheses. The hypotheses were also linked to the research aim and objectives to ensure the drawn inferences' relevance. Providing detailed and relatable descriptions eliminates any form of ambiguity, and learners and other researchers determine whether or not they can apply the study findings to other social groups (Drost, 2011). Finally, as used in this study, triangulation methods involved various sources in enhancing the research findings and describing the issue being investigated. To improve the validity of the study findings, data was collected through individual interviews as well as via critical observations during the interviews that were held between the researcher and the research correspondents. Similarly, reliability was achieved by making a valid comparison between the study finding and that from existing studies. It is also worth noting that using existing scales such as the OLSSES scale ensured that the research validity is upheld.

### 3.8. Reflexivity

A study's reflexivity involved a critical self-reflection while considering the personal assumptions, possible biases, and the relationship to the study topic that could affect the results (Darawsheh & Stanley, 2014). The entire study required the researcher to be self-aware and monitor the individual triggers that could influence the reliability and validity. Considering that the Internet is often associated with improved student performance, the study had to ignore this assumption and focus on the participants' individual experiences. To ensure quality results, the researcher monitored the personal biases and assumptions found in other articles that could potentially affect the interpretation of obtained data and creating the themes.

### 3.9. Methodological Limitations

Opting for online interviews and surveys rather than face-to-face meetings with the respondents limits the study. The researcher cannot wholly judge the accuracy of the study participants' information. The large sample size would also complicate the data collection process as everything was done online. To ensure the accuracy of data and an easy data collection procedure, the study used focus groups. The focus groups provided an interactive experience as the participants listened to each other and contributed to the discussions during the interviews. The Interwise conferencing tool bridged the geographical gap between the researcher and the study participants. It provided a two-way connection, enabling the researcher to submit the interview questions and surveys. Finally, using qualitative and quantitative research contributed to the accuracy of the findings as each approach's strengths would outdo their weaknesses.

## 4. Results

The OLSES scale scores determined the students' perceptions of their intellectual competence in their experience with digitized learning. The factor analysis on the twenty-two OLSES scale items led to the exclusion of the second item. It had a factor loading less than the recommended .40, as explained in the previous section. The analysis resulted in a factor loading ranging between 0.835 and 0.923, and a mean value of 0.894. The total variance of 79.92% and 16.77 eigenvalues was obtained from the individual scale items' factor loadings. The distribution of the factor loading of the scale items after excluding the second item is depicted in Table 4.

**Table 4**  
*Distribution of OLSES Scale Items Factor Loadings*

Scale Item No.	Factor Loadings
1	0.849
3	0.894
4	0.897
5	0.865
6	0.868
7	0.907
8	0.922
9	0.918
10	0.903
11	0.835
12	0.892
13	0.920
14	0.911
15	0.908
16	0.923
17	0.887
18	0.916
19	0.872
20	0.884
21	0.899
22	0.895
<b>Eigenvalue</b>	<b>16.77</b>

The study applied the scale analysis with the twenty-one items to the study participants. The 21 items used to derive the OLSES scale scores relate to the influence of digitized learning on students' learning experiences, levels of self-efficacy, and perceived intellectual competence. As mentioned earlier, the study opted for mode and median in the descriptive statistics and range rather than the standard deviation for more straightforward interpretation and reliability of the study findings. The OLSES scale item scores of the students' self-efficacy and perceived intellectual competence following the descriptive analysis are shown in Table 5.

**Table 5**  
***Perceived Intellectual Competence and Self-Efficacy***  
***Scores-descriptive analysis***

Item	Mode	Median	Range
1. Easier search for information.	5	4	4
2. Improved ability to process information.	4	3	4
3. Facilitates curiosity, thus encouraging more learning.	4	4	4
4. Increased ability to solve problems.	5	4	4
5. Solve technical and academic issues on my own.	4	4	4
6. Access online course materials freely.	5	3	4
7. Better time management.	3	3	4
8. Successfully and timely completion of assignments.	4	4	4
9. Effective communication with other online users.	4	3	4
10. Effective communication with instructors through e-mails and online chats.	4	4	4
11. Learning at one's own time and location.	5	4	4
12. Learning in the absence of the instructor.	4	5	4
13. Easier communication via asynchronous technologies.	4	3	4
14. Meeting deadline without reminders.	3	4	4
15. Increased knowledge on a variety of subjects.	3	4	4
16. Better reasoning and knowledge application.	4	4	4
17. Focus on schoolwork despite other distractions.	5	4	4
18. Efficient use of library resources.	4	4	4
19. Developing and following a proper plan when handling school assignments.			
20. Learn independently in the absence of other learners.			
21. Opportunities to ask questions through online forums and discussion boards.			

On the other hand, the oblique rotations used in the analysis of the LOES-T scale's engagement construct yielded identical factor combinations, which simplified the interpretation of the data. The structure aligned with the scale items in Table 3. The factor loadings of the LOES-T scale are depicted in Table 6.

**Table 6**

***Oblique Rotated Factor Loading on LOES-T***

Scale Item (Students' Engagement)	Factor Loading
Interact	0.556
On task	0.935
Motivated	0.740
Eigenvalue	0.73
Total Percentage	73.8

Based on the LOES-T results in Table 3, all the teachers (n=8) agreed that introducing the students to online learning sites then leaving them to explore on their own has motivated them to continue learning about particular concepts. 63% (n=5) of the teachers agreed that they provided a formal demonstration of web-based learning tools while introducing the topic and assigned tasks that would necessitate using the Internet. The rest of the teachers, (n=3) mentioned that although they did not introduce the online learning tools at the beginning of the class, the students used handouts as guides to their web-based learning activities. All the teachers (n=8) confirmed that the students engaged in classroom discussions to share their knowledge. Over 80% of the teachers agreed that students were more engaged when using online learning sites to complete their after-school assignments.

#### **4.1. Perceptions of the Internet in the Completion of Schoolwork and Learning Capabilities**

The qualitative outcome of this research conveyed the learners' opinion concerning their utilization of the Internet to handle after-school assignments and its influence on their learning experiences. While the points addressed by the respondents are similar to the ones

in the quantitative study, all the participants expressed their opinions on whether and why the technological development in learning has enhanced their learning capabilities. When asked about how often they used the Internet for their after-school work, all the participants (N=387) confirmed that they search for information online whenever there is a misunderstanding or a need for additional knowledge. For instance,

*I use the Internet more often than I read a book whenever I need to research my homework. Whenever there is a problem when working on my assignment, I seek information on Google, and if I do not find it there, then there are other online sites that can help.*

86% of the participant population affirmed their constant use of the Internet to complete their assignments, viewing it as engaging, interactive, fun, and easy to solve problems. The remaining 14% confirmed that they do not entirely depend on the Internet as they read their textbooks first when handling after-school assignments. However, all the respondents mentioned that the Internet helps them successfully accomplish their tasks as they share their workload with other students.

60% of the students acknowledged that the constant use of the Internet had increased their proficiency in different study areas. As agreed by the student participants, *I am more proficient in using the Internet than I am with my textbooks and encyclopedia. This has helped me learn more than what I am taught in the classroom.* 48% of the students viewed the process of seeking information from books as boring, annoying, and too demanding:

*Searching for information online requires less information than reading the encyclopedia. Finding information from books is a lengthy process. You have to find the book, turn the pages, and look for information. You hardly find precisely what you are looking for.*

While the students agreed that the Internet was more efficient, books were also viewed as more detailed than the internet sources, as



agreed by 50% of the respondents. The students agreed that books provide essential knowledge. In contrast, the Internet provides an opportunity to acquire advanced knowledge on some of the concepts that may not be available in the textbooks.

42% of the students believed the Internet's utilization during the learning and knowledge acquisition process has significantly improved their capabilities. As suggested by one of the respondents,

*I have always believed that the Internet has made my generation better learners than the generations that did not use computers because we have access to more information. The Internet has so much knowledge, making it easy for anyone to learn anything and apply the same knowledge in school.*

The respondents agreed with one of the students' opinion: *Our generation is exposed to more information compared to the previous generation at a young age. We can become more curious and improve our abilities to learn and reason as we grow up.* 58% of the sample population viewed the use of hardcopy of the available books as the most effective approach to learning and acquiring new information. 46% of the 58% believed that most of the information available online is expounded in books. Depending on the textbooks' knowledge, it makes use of textbooks rather than online platforms the most preferred approach. However, all the students agreed that searching for information online has made them better learners and increased their competency levels as they learn more. The interviewees concurred that learning different subjects online helps them solve problems independently as they can apply the acquired knowledge in school and different aspects of their lives. One of the students concluded: *rather than getting tired by reading hundreds of books only to find information on one topic, you can browse on the Internet and quickly check different sites while searching for more details.* From these findings, it was perceived that the Internet is easier to use, encourages learning, and increases students' perception of their intellectual competence.

## 4.2. Perceptions of Students' Engagement

The teachers (n=8) agreed that students' learning activities outside the classroom involved using the Internet to complete after-school assignments. The respondents believed that the internet-based learning activities were more student-centered, allowing them to learn at their own pace and exercise more control over their learning experience. One of the teachers stated: *The Internet has given them more control over the content that they can use to achieve their class objectives. In such cases, you seem to observe more interest by the students in the school-based activities.* In another response, a teacher alluded to the online learning environment's significance in encouraging learners to use different approaches when working towards a common objective: *I remember asking them to print posters addressing some social crime and present it in class. Some used Glogster, others PowerPoint, and other different approaches that I was yet to teach in class. There were so many different ways, but I still got the posters.* All the teachers agreed that digital learning has made the learners more engaged in the classroom and learning activities as they teach others about what they may have learned from different online learning sites:

*I understand that I may not cover every classroom content, so their effort to seek information online is quite encouraging. Eventually, the students share ideas on how to do different things, so I need to increase their online engagement.*

Overall, the teachers regarded engagement as the main impact of the students' use of online learning sites as they affirmed that:

*The students are more motivated, they seem to enjoy using the Internet, and they are more excited about learning subjects that they were least interested in before being introduced to web-based learning tools.*

## 5. Discussions

### 5.1. Perception of Students' Academic Experience

The study findings and the discussion throughout this paper are in line with Bandura's social cognitive theory. It explains human beings' belief about their abilities to accomplish a specific task (Yokoyama, 2019). The students involved in the survey and interviews for this study confirmed their extensive use of the Internet. The descriptive analysis results revealed a midpoint of 3 in the range of 1-5, hence the conclusion that all the students perceive themselves as intellectually competent and self-efficacious due to the opportunities presented by the digital transformation of learning. A majority of the students confirmed through the interviews that their relationship with the Internet had created learning opportunities for them as their curiosity about different subjects drives them to seek more information from different online sites. The participants agreed with one of the students who mentioned that the Internet had created an opportunity to *learn more than what I am taught in the classroom*. This concurs with the study by Zhang (2013), which suggests that the use of the Internet has made learners perceive themselves as more creative and imaginative, thus expanding their knowledge paradigm.

The survey results and interview results suggest that the Internet's interactive nature facilitates high academic self-efficacy among students through a collaborative learning process. The results on collaborative learning, as depicted in Item 9 (Effective communication with other users), Item 13 (easier communication via asynchronous technologies), and Item 21 (opportunities to ask questions through online forums and discussion boards), show that the online discussion on different platforms contribute to the learners' knowledge as they can use other students' experiences to solve individual problems. The findings on the effect of the digital environment's collaborative nature on students' perception of their learning capabilities contribute to the study by Yang (2012). According to Yang (2012), unlimited access to the Internet has created learners' opportunities to engage in collaborative learning, resulting in increased knowledge. As a result, the students perceive

themselves as self-efficacious while owing their high intellectual competence to internet-based learning.

## 5.2. Perceptions of Self-Efficacy and Self-Regulation

The students perceived themselves as more creative and curious to learn due to their exposure to the Internet. Although a majority of the participants agreed that the pre-ICT generation is more learned due to the vast knowledge derived from books, all the participants agreed that the complete information on the Internet has made it easier for them to learn anything and be competent enough to succeed in any task while applying the acquired knowledge in their school work. Items 3, 4, and 5 with scores  $\geq 4$ , as shown in Table 3, prove the role of digitized learning in the high curiosity among students. Moreover, through the interview, the qualitative results confirm that the digital transformation of learning has catered to the students' curiosity as they have a chance to search for information from different online sites. This contributes to the studies by Rodriguez and Armellini (2017) and Taipjutorus et al. (2012), who suggest that the constant information-seeking process and curiosity among the students contribute to developing their academic confidence metacognition, making them optimistic about achieving better academic results.

The students' perceived learning capabilities due to their high affinity for the Internet align with this paper's argument that the digital transformation of learning has resulted in a high correlation between intellectual competence judgment and academic performance. The agreement by all participants on the application of the knowledge acquired from the Internet to school-related tasks supports the arguments by Zhu et al. (2011) and Tsai et al. (2011) that students who use online sources to complete their school assignments are confident about their success in performing different tasks, resulting in a high level of academic self-efficacy. The digitized learning environment has increased learners' academic capabilities. They are more confident in using their acquired skills and knowledge to solve problems that they may encounter within the classroom while realizing positive outcomes. The present study's findings prove this argument through the participants' confirmed results on how they use

information that they acquire from online sites and discussion forums on their daily after-school assignments.

The outcomes of the survey and interviews allude to the self-regulation aspect of the digital learning environment. Based on the scores of the OLSES scale in the survey, the students confirmed the influence of the digital learning environment on their self-regulated learning experience as they can solve technical and academic problems on their own, manage their time, study at their desired time and place and learn independently without direct interference from their instructor and other students. The findings on the correlation between the self-regulatory nature of digital learning and students' belief about their intellectual competence contribute to the study by Valencia-Vallejo et al. (2018) and Lavasani et al. (2011), who conclude that online learning sites encourage self-regulation learning behavior, which then leads to high students' confidence about their capabilities. Students who benefit from online sites feel more knowledgeable and are more confident in their abilities to reason, apply knowledge to solve problems, and succeed within and outside the classroom (Rodriguez & Armellini, 2017).

### **5.3. Perceptions of Students' Engagement**

The teachers provided evidence that the students' use of web-based learning tools was highly engaging as they have the opportunity to exercise control and ownership of their online activities. The result of the online interactions with other students and the instructors led to behavioral engagement, which resulted in cognitive engagement. This confirms Gibbs and Poskitt (2010) argument that overall student engagement is based on emotional, behavioral, and cognitive constructs. The teachers' aspect of learner control was also addressed, who noted their students' efforts to use different approaches to achieve a common learning objective. The findings are in line with Barbour and Bennet's (2013) study, which regards the Internet as a useful tool in enhancing students' behavioral and cognitive engagement. They become comfortable enough to share knowledge and interact with each other.

The present study establishes that the outcome of the excellent student-student and student-learner relationships, as mentioned by the students and teachers, is a significant part of enhancing students' engagement in the classroom. The support that comes with the right relationships fostered by the Internet also led to the development of a social presence that enabled the students to add to the knowledge acquired in the classroom through extensive research and communication on learning forums. This contributes to Louwrens and Hartnett (2015) argument that the learning tools in the digital environment improve learners' efforts to research and understand complex concepts, resulting in increased cognitive engagement. The sense of belonging emerging from the students' social presence and connectedness, as confirmed by the study participants, also increases their behavioral, cognitive, and emotional engagement. As confirmed by the LOES-T scores, there is a positive correlation between students' engagement and digitized learning as the students regularly interact with web-based learning tools, are more interested in helping each other accomplish their learning objectives and are motivated to use the Internet as a learning tool. Therefore, teachers must ensure that students focus on online learning activities and interact with each other to achieve their objectives by providing support and encouragement, as suggested by Dixson (2010)

#### 5.4. Conclusion

The quantitative data obtained from a survey using the OLSES scale and the LOES-T scale, and qualitative data through the interviews confirmed the significant role of the digital transformation of learning on students' intellectual competence, mainly through their after-school online experiences. The students' perceptions of their intellectual competence and academic self-efficacy correlate with their high use of the Internet in after-school learning activities and the collaborative nature of the online learning experience. Moreover, web-based learning tools also contributed to the students' emotional, behavioral, and cognitive engagement, which resulted in an improved learning outcome, as confirmed by the teachers. The curiosity to learn

more and the interactive nature of the online learning environment, as confirmed by the present study findings, enhance students' perceived academic self-efficacy and their attitude towards their school-based learning success. Based on the findings, this study suggests that (1) schools should work towards increased use of digital learning technologies to facilitate learning; (2) Instructors should use appropriate online features to create an asynchronous learning environment for constant learner interaction; (3) Students should be trained on the features of advanced digital learning technologies for them to transform their knowledge of different online concepts into actual academic results.

## 6. Suggestions for Future Research

This study relied on mixed research methods, specifically a quantitative survey using the OLSES and LOES-T scales and a qualitative study using online interviews through the Interwise conferencing tool. While the study variables were influential in determining the efficacy of the digital transformation of learning on the perception of students' intellectual competence, the inclusion of additional components in the interviews and scale items would have contributed to better results. Future researchers should consider student autonomy and learner-content interaction to determine learners' beliefs on their academic self-efficacy in future studies. Future research should also build online student engagement to determine the differences between engagement patterns for students who continuously use the Internet to complete after-school assignments and those who rely on traditional learning methods.

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## Appendices

### Appendix A

#### *Students' Online Learning Self-Efficacy Questionnaire*

Please check one box that best describes how the Internet has helped you in your school and after-school assignments. The information will be useful in the study. There are no right or wrong answers.

Student ID _____	Date _____					
		Disagree entirely	Disagree	Undecided	Agree	Agree entirely
		1	2	3	4	5
1. I can easily search for information.						
2. I can easily understand and process information.						
3. I become curious and feel more encouraged to learn.						
4. I am more capable of solving problems.						
5. I can solve technical and academic problems on my own.						
6. I can access online course materials freely.						
7. I have better time management.						

	Disagree entirely	Disagree	Undecided	Agree	Agree entirely
	1	2	3	4	5
8. I complete my assignments earlier.					
9. I can easily communicate with other online users.					
10. I can effectively communicate with my instructors through e-mails and online chats.					
11. I learn at my own time and location.					
12. I can learn in the absence of an instructor.					
13. There is easier communication through asynchronous technologies such as message board forums.					
14. I easily meet deadlines without reminders.					
15. I am more knowledgeable about many subjects.					
16. I am better at applying					

	Disagree entirely	Disagree	Undecided	Agree	Agree entirely
	1	2	3	4	5
knowledge in real-life situations.					
17. I have more focus on schoolwork.					
18. I have improved my use of library resources.					
19. I develop and follow a proper plan when completing my school assignments.					
20. I can learn in the absence of other students.					
21. There are more opportunities for me to ask questions through the online discussion boards.					

## Appendix B

### *Teachers' Learning Object Evaluation Questionnaire*

	<b>disagree entirely (1)</b>	<b>disagree (2)</b>	<b>Undecided (3)</b>	<b>agree (4)</b>	<b>agree entirely (5)</b>
1. The students frequently interact with the web-based learning tools.					
2. The outcomes of after-school assignments show the extensive use of the Internet.					
3. Students are more motivated when using the Internet as a learning tool.					
4. Students are more engaged in helping each other accomplish tasks.					

## Appendix C

### *Online Surveys*

Feature	Description
Method	Two methods: Students' self-report questionnaire and teachers' reports of students' engagement.
Administration	<p><b>Student Self-Report</b></p> <p>Administered by: The researcher on online platforms.</p> <p>Form: Online questionnaire.</p> <p>Time: Online self-efficacy questionnaire (21 items) takes about 1 hour to check one box in all items.</p> <p>Instructions: Students are advised to read aloud all items and check one box in each item. There is no right or wrong answer.</p> <p><b>Teacher Report</b></p> <p>Administered by: The researcher on online platforms.</p> <p>Form: Online questionnaire.</p> <p>Time: Learning objective evaluation questionnaire takes half an hour to check a box in each question.</p> <p>Instructions: The teacher should check one box in each item.</p>
Language	English



## Appendix D

### *Extracts from the Interview and Discussion*

#### **How do you think teachers and the internet help to increase the students' online and class engagement?**

TEACHER 2: Most times, they have so much control over the content they can display online. So, yeah, I see more involvement from that.

TEACHER 4: *I remember asking them to print posters addressing some social crime and present them in class. Some used Glogster, others PowerPoint, and other different approaches that I was yet to teach in class. There were so many different ways, but I still got the posters. Maybe this is why they are more engaged in online sites.*

TEACHER 1: Most of it could be through peer assessment. Sometimes I have them and their peers make constructive comments to each other's work and give them that praise may be a form of motivation.

TEACHER 7: Also, trying as much as possible to praise and comment on what they have done...praising a few so that others can feel motivated to make more effort. That gives the students an idea of just how useful the Internet is in adding to what we teach them in class.

TEACHER 3: Building up their confidence. You know kids often show an interest in so many things, so you have to help them realize how important it is to continue working towards something. The Internet helps to achieve this too. And, ah, building up that relationship with each other online and in the classroom helps a lot.

TACHER 5: At the start of every school session, just trying to help them navigate the available online features. Sometimes the Skype sessions...because this is how they can learn to interact with other learners beyond their school environment. You know... I see things differently.

**TEACHER 4:** *Sometimes, we have a student that starts a discussion and may not get the expected response. In such cases, behind-the-scenes stuff with Skype and online discussions helps them a lot. So, they get some of that interaction.*

**TEACHER 8:** *It is nice when you see them knowing other kids better. Well, they try to interact with kids in class and talk to other students on Skype. So, sometimes you'll see a student who was so shy when joining school chatting with others and making constructive comments in class... it's quite evident that they have been more engaged in the online platforms, resulting from it.*

**TEACHER 6:** *It is also a matter of them knowing how to interact with students from different schools and parts of the world. Skype or e-mail and the messaging options in the different sites make it easier to achieve this.*

*What encourages you to engage in online learning activities.*

**STUDENT:** *In the typical classroom, the teacher is focused on so many things...like a whole bunch of students, not just me. By online, I, um, get the attention I need from the teacher and other students to ask questions and get help while completing my school assignments.*

**STUDENT:** *I also know so many people who can help with different tasks. This happened after I started engaging in online discussions. Some of them are so good at other things, so I learn more than what I am taught in class.*

**STUDENT:** *Yeah, everyone helps each other...telling them how to improve what they already have or how to do something different.*

***How often do you use the Internet and why?***

**STUDENT:** *I use the Internet more often than I read a book whenever I need to research my homework. Whenever there is a problem when working on my assignment, I seek information on Google, and if I do*

not find it there, then there are other online sites that can help.

*STUDENT:* I use the Internet in almost every after-school assignment, so it's many times. Searching for information online requires less effort than reading the encyclopedia. Also, finding information from books is such a lengthy process...you find the book, turn the pages, and look for information. I hardly get what I'm looking for most of the time.

*STUDENT:* I feel like I'm better at finding information from the Internet. Information is more available there. I strain a lot whenever I have to find something from my textbook.

*STUDENT:* I am more proficient in using the Internet than I am with my textbooks and encyclopedia. This has helped me learn more than what I am taught in the classroom.

**Do you think that the Internet has made you a better learner compared to previous generations?**

*STUDENT:* I have always believed that the Internet has made us better learners than the generations that did not use computers...we have access to a lot more information, and the Internet has so much knowledge. They only relied on books, but we use both books and the Internet.

*STUDENT:* Our generation has access to more information than previous generations to learn a lot from a young age.

*STUDENT:* Learning is much easier now and not like in the past. Nowadays you can learn anything from the Internet. I cannot say that I am a better learner than someone from the previous generations, but I know more things from different subjects.