UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MASTER THESIS

ONLINE DISTANCE EDUCATION AS A TOOL FOR IMPROVING THE QUALITY OF LIVING AND EDUCATION IN EGYPT

Ljubljana, October 2020   Mohamed Ahmed Mohamed Mahmoud

AUTHORSHIP STATEMENT

The undersigned Mohamed Ahmed Mohamed Mahmoud, a student at the University of Ljubljana, School of Economics and Business, (hereafter: SEB LU), author of this written final work of studies with the title Online Distance Education as a tool for improving the quality of living and education in Egypt (Spletno Izobraževanje na daljavo kot orodje za izboljsevanje kakovosti zivljenja in izobrazevanja v Egiptu), prepared under supervision of Asst. Prof. Jure Erjavec

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INTRODUCTION

Tunis has been the first country to inspire the many revolutions to come, this has led Egyptians to believe that a change is possible; Egyptians started using social media platforms like Facebook and Twitter to exchange ideas, plan peaceful protests in the first digital revolution in history (Maurushat, Chawki, Al-Alosi & El Shazly, 2014). 25th of January 2011 marks a new beginning for Egypt, as for the first time in the Middle East, a president who held control of a country for nearly three decades was overthrown by the power of the people. With the new change in power, the demand for a higher quality of living in all fields of life was expected to get improved under the newly elected government. Corruption won't be ignored as the country wants to have a fresh start and move into a brighter future.

According to a statistical study done by the European Commission, Gross Domestic Product (GDP) is not a sufficient indicator to measure the progress of countries, thus multiple indicators are needed to be analyzed to gather a better understanding of the development of countries (European Commission, 2015). Education was one indicator that the European Union suggests analyzing to improve the quality of living of people, as it helps to develop the economy by increasing productivity and the number of jobs available (Ashiagbor, 2005).

Education helps satisfy the market needs by improving the quality of labors (Dimian & Barbu, 2004), It helps in solving political conflicts (Smith, 2010), lower crime rates (Lochner & Moretti, 2004), and provide a healthy political life for the public (Ionescu & Cuza, 2013). Educated individuals lead a healthier life compared to poorly educated individuals (Oreopoulos, 2007), they also have lower death rates (Mackenbach, 2006), and can manage their life more effectively (Escuder-Mollón & Cabedo Manuel, 2014). Improving education is a mandatory step towards a brighter future for Egypt, however, after the revolution, Egypt has been suffering the biggest economic crisis since 1930 (Kingsley, 2013).

Tourism is one of the pillars of the Egyptian economy, contributing to $13.6 billion in 2010 (Monks, 2015), 12 percent of Egypt's workforce is employed in the tourism sector (Dziadosz, 2009), with over 11 percent of the country's GDP is earned by the tourism sector (E TurboNews, 2011), in 2016, only 3.4 billion dollars in revenue was achieved, a loss of over 10 billion dollars compared with the year 2010. The instability of the Middle East area has led to the decline of foreign investment (Khan & Miller, 2011). Also, the recent breakout of the Coronavirus has damaged the world economy severely.

In this dissertation, we will focus on how developments in online education and best practices of education worldwide can help improve the education system in Egypt, as improving the education system will help improve the quality of living of Egyptians in the 8 areas defined by Eurostat as factors that affect the quality of living for people.

Those factors are material living conditions, productive & main activity, health, education, leisure &social interactions, economic & physical safety, governance & basic right, natural & living environment, and the overall experience of life.

In the first chapter, we will be talking about online education, and how online education as we know it now came to existence by exploring the advancement of technology, steps, and people that made it possible. We will answer the question of what advantage online education have over traditional methods, also stating the challenges facing online education. Finally, we will be looking in this chapter at best practices from different countries and organizations.

The second chapter, we will include information about the demographics of Egypt including Socioeconomic challenges, history of education in Egypt, problems in the educational sector in Egypt, and how it's compared to pioneers of education like Finland. We will discuss the literacy problem that Egypt suffers from.

In chapter three, we will explore how COVID 19 affected education and economy around the world, and how different organization coped with the pandemic focusing on education.

In chapter four, we will conduct a survey testing the general population knowledge about the education system in Egypt, so to validate the theoretical points that we uncovered in this research. Finally, we will give a conclusion about the findings of this research.

1 ONLINE EDUCATION DEVELOPMENTS AND APPLICATION

Online learning can be a blurry term as there isn't a strict definition that defines it, there are many terminologies that surround online learning thus, leading to more confusion among people. Terminologies like web-based learning, e-learning, internet learning, online learning, distance learning, distributed learning, computer-mediated learning, and computer-assisted learning, are all used when discussing online learning (Joksimovic, Kovanovic, Gasevic, Dawson & Siemens, 2015).

Many professionals assume that e-learning is defined only, when all processes of learning take place online (Oblinger & Hawkins, 2005). Today when e-learning is mentioned, it usually means one or more courses are delivered through the use of technology. A hybrid approach between tradition education and using technology can be implemented based on different scenarios to achieve better results.

The learning process can be delivered through different information and communication technologies, most commonly through computers, networks, and the internet, education through satellite technology and mobile phones are used in some cases. E-learning can be referred to as technology-based learning in some cases (Uzunboylu, 2004).

Some terminologies that are used in the context of e-learning are defined below.

Distance Learning: Is the type of learning, where distance is not an obstacle, meaning that the tutor and the learner are not bound by location (Berg, 2020).

Web-learning: Is similar to online learning, and is defined as delivering the education process through the internet.

Computer-based learning: Is the type of learning, where computers are used to deliver the education process.

Mobile based-learning: Like computer-based learning, but in this case, a portable device is used.

Correspondence Courses: Courses are conducted through regular mail (Stem, 2003).

Tele courses: The courses are delivered through television or radio.

Distributed learning: It's a strategy to enhance the outcome of the educational process; it uses a technique that increase the number of sessions used to deliver certain information, rather than teaching the information in one session. This technique can be helpful in improving the learning process in certain areas like text comprehension. Distributed learning was mentioned because it is a term that is usually associated with e-learning for wrong reasons (Victor& Hart, 2016).

1.1   Advantage of E-learning

E-learning is a complex process, that both have advantages and some challenges to be implemented successfully, thus knowledge of the advantages and the challenges is vital for decision-maker.

E-learning provides many benefits like, expanding to new markets, as in the example of the University of South Pacific that targeted more demographics with their online foundation courses in biology, allowing a larger number of students to access the course, who wouldn't be able to attend using normal means (Appanna,2003).

E-learning allows more flexibility for students to study at their own pace, which leads to less stressful educational process, along with delivering a personalized learning experience to each student. E-learning also helps students with tighter budgets to gain access to a higher quality of education that they wouldn't be able to afford using traditional education. Online degrees are usually cheaper than non-online degrees (Sadeghi, 2019).

E-learning allows people to both work and continue their education at the same time, thus improving their economic state and their career path, as they don't have to stop work to pursue

a degree. E-learning helps people with shy personalities continue their education without any mental restrictions, it also might provide a better method of teaching with people with disabilities using advanced technologies (Zounek & Sudický, 2013).

E-learning lowers costs of training for the staff as staff from different locations or branches don't need a physical place for the training to occur, thus making it more efficient, It helps the staff improve their knowledge by using online courses to be always up-to-date with relevant skills and teaching methods, this process takes place at a much faster pace than traditional methods.

In one study it was shown that e-learning may develop cognitive abilities in students, it was shown that a student with access to an unlimited amount of information using the internet had higher academic achievements. E-learning improves basic computer skills that are essential in daily and practical life; it also boosts motivation levels for researchers to publish higher-quality research papers online with the approval of their supervisors.

Applying technology in the educational process can help evaluate students more precisely, as it provides a better view of the performance of each student showing his strength and weaknesses points.

1.2   Challenges to E-learning

E-learning can lead to higher distraction compared to face-to-face learning, especially in the case of a high number of students. Human interactions help students perform better; this is because face-to-face interactions build a much stronger bond between students and educators.

E-learning is only available if some investment from the education institute takes place in the first place, failing to estimate the initial costs and the specification of the system can hinder the performance, also some initial costs are required for students, and some students from poorer backgrounds don't have enough funds for such a solution.

E-learning depends on technology; a problem with equipment or software can bring the learning process to an end. Lack of social interaction can lead to isolation, lower social skills, and depression rates, also e-learning doesn't provide physical interaction in the learning process, an example would be interacting with compounds in a chemistry lab or attending a workshop in an engineering course that requires the use of hands to achieve desired outcomes.

Conditions like computer anxiety can be dangerous for students if there only option is e-learning (Auror & Dhull, 2019).

Online degrees aren't very well perceived in the job markets. Lack of knowledge of technology and skills needed to apply the learning process lead both educators and students to

lose the motivation of delivering the learning process through technology, they assume it's just a trend and a waste of investment, rather than being a practical alternative that can provide advantages if applied correctly. Problems like data security are common when technology is used, also depending only on technology can hinder the education process.

For e-learning solutions to work, Elearn magazine suggest steps to choose the right solution (Kapp, 2003). Those steps are mentioned below.

E-learning solutions should be easily maintained over longer periods, easy to be administrated, easy to be used, suitable for your needs, also it should have recording abilities to be able to store and analyze the data.

We should ask whether we have enough technical knowledge to gain the desired outcomes from such a solution, we should also strive to make e-learning accessible to all users, taking into consideration their location and what technology they can access.

The use of modules can be a valid solution; modules are small interchangeable knowledge objects that can be used in different e-learning solutions or replaced with another module to provide a different function. Finally, before implementing a solution, it should be tested to validate all the previous steps.

1.3   Distance Learning History

Distance learning passed by many phases to reach where we are today, we will be looking in this section at how distance learning evolved during history.

Correspondence: Is teaching through regular mail, it can be traced back to the year 1728 when Caleb Phillips posted courses in a newspaper, when the American postal was founded correspondence education became more common (Ferriman, 2013).

In the year 1804, some historians think distance learning emerged when Sir Isaac Pitman mailed text on postcards to students; they would mail their assignments back to him through the mail. In 1858, university of London was the first to implement a degree using distance learning, and later in 1873, the first correspondence school came into existence in Boston in the United States, while the term distance education was first used in the year 1892.

In 1906, a school in Maryland was the first primary school to offer correspondence courses, while University of Wisconsin used phonograph technology to send studying materials to learners separated by geographic distance. In 1922, the University of Pennsylvania became the first university to make studying material and courses available on radio.

In 1950, Iowa University became the first university to own a fully educational television station, and after ten years the first intranet system emerged, Intranet is a network that students can use to get materials and record classes, it was created in the University of Illinois (Florida National University, 2019). IN 1962, Licklider of MIT University imagined a concept where devices are connected and can access data from each other, this system is what we now call the internet, and in 1969 a message interface network connected 4 universities across the United States (Ferrer, 2019).

In 1974, virtual campus in Coastline Community College came to exist, for the first time in history college degree were offered through telephone, television, radio, and other technologies. In 1979, the first game used for education was developed, it was called LemonadeStand. players used lemon as an ingredient to market, cost estimate, and sell lemons in the game.

In 1983, the internet as we know it now came to exist, 2 years later the first accredited online program was available in the Nova Southeastern University. In 1990, Linux was created, which was the inspiration for many open-source programs. In 1991, World Wide Web the internet was available for the public. Jones university became the first fully online accredited university in the world in the year 1996 (Tom, 2017).

In 1998, Google search engine was founded which will play a huge role later in people's lives, and impact education academic research. Much advancement followed after Google, examples of those advancements would be Wikipedia, the Open Course Ware project from MIT University, Khan Academy, and Udacity which made huge amounts of learning materials and classes available online.

With those advancements, new regulations, and policies were required to give accreditation online. In 2013, the University of Florida became the first online public university in the United States. Again, we should be thankful for those people who came before us as they provided the building blocks to the learning process as we know it.

1.4   Application of E-learning to improve literacy

Literacy is a problem that some countries still suffer from. We will look at how some countries used technology to help improve the literacy rate. The suggestions are taken from the report done by UNESCO, the report explores how different countries used information and communication technologies (ICT) to fight literacy (UNESCO, 2014).

Cape Verde developed a Distance Learning program through Radio and other ICTS devices like computers. A unified curriculum was used to reach more people and raise awareness about the problem, Somalia used a similar approach to tackle the problem.

Kenya used Self-help groups that use ICTS to link the education process to the Kenyan culture in the poorest areas focusing on topics like fishery, tourism, and environmental issues to increase awareness. Kenyans participated in activities other than education like growing food, harvesting forest, and planting as a way to increase income while learning.

Niger used mobile learning as a mean for teaching basic skills like reading and writing, SMS were used to help people function in daily situations. Skills like selling items, comparing items prices, and posting items through the phone were developed to help people improve their living conditions.

Senegal approach to improving female literacy rate focused on using television, face-to-face classes, and computer materials. Another project in Senegal used texting between students as a way to learn and increasing collaboration.

Iraq Mercy Corps a nonprofit organization used empowerment of women to combat literacy; they educated women about their rights, and used networks to provide role model examples to women. Mobile software with a database was used in the learning process, the database contained information about other women with similar interest to facilitate interaction and learning.

Lebanon used computer-based images, texts, and sounds to teach reading and writing in a more engaging way. In Jamaica, they used ICTS to teach reading, writing, and math up to grade 13. In India, they used subtitles with the same language used in major TV shows, and movies, this approach is used to help improve reading and writing skills in a more engaging way.

In Pakistan, they implemented a 6-month duration program, the first 2-month learning was done through traditional classes and phase 2 consisted of using mobile learning techniques to monitor and improve progress. In Brazil, they developed a mobile app that shows pictures with text as a method for learning, while Germany used only online learning to fight literacy, they took this approach to prevent psychological barriers for learning, and help in balancing work to social life ratio. We can see using those examples the role of technology in helping people improve their education and daily lives.

1.5   Satellite Education

Education through satellite connection can provide many benefits over traditional ways; Satellite provides coverage to locations with a minimum investment in infrastructure. Satellite education provides immediate access as soon as the satellite is deployed; Satellite also provides a backup emergency solution when disasters happen. Satellite education delivers quality education and provides a fair chance for our students.

In the report done by ESOA which stands for EMEA Satellite operation association, they picked some examples of e-learning solutions that use the satellite to help improve the learning process; Solutions from different countries were chosen (ESOA, 2017).

Intelsat cooperated with a non-profit organization with the name of Mindset that used different channels to deploy education material across South Africa. In 2012, a program with the name of Space4education was used to empower educators by training them with the help of satellite to improve their teaching abilities; it enabled internet connection to educators outside their working hours.

In Jordan in 2016, the first connected solar school with the power of satellite was launched. Electricity, educational tools, and internet connectivity became available to provide education in a refugee camp in Jordan. In Pakistan, they used a moving satellite van to bring the connection to rural areas.

The satellite has been used to improve the voice and video services quality in education at Galapagos Island. A satellite solution was used in the Amazon region in Brazil to provide video conferencing for people living there, as accessing school is quite a challenge.

They used satellite to provide medical materials to doctors in India, this approach helped doctors continue their post-graduate degrees without leaving their jobs. In Saudi Arabia, they used Arabsat to provide a connected platform developed by University of Jizan to provide lectures.

2   A LOOK INTO THE FUTURE

In this chapter, we will be checking the technologies that will shape the future of the coming generation along with the trends shaping the education system as it's important to know what the future holds to anticipate the change and be ready for the change ahead. US Department of labor force predicts that 65 percent of students studying at schools now will be at new occupations that didn't exist before (Florida International University, n.d.).

2.1   IOT and future application

The internet of things (IOT) is system that use data collected by sensors in machines and objects to use through connected devices. The future machines and objects that can have sensors are limitless. Cars, buildings, rooms, electronic devices, and many others can have sensors and will be connected to the IOT for different applications; ideally, those machines will communicate through wireless networks automatically through multiple vendors without the interfering of humans (Vongsingthong, & Smanchat, 2014).

IOT will deliver solutions to improve all sectors in life from security, education, energy, consumption, manufacturing, retail, agriculture, games, TV consoles, and many more devices. IOT will connect everything and everyone in what GSMA refers to as connected life, this will help make the data-driven decision easier, as the data collected will be so huge and can be applied to all sectors in life.

More precise decisions that will improve the economy and provide new business models with added value services will be the norm (GSMA, 2014). Connected devices are expected to reach more than triple the number of the world population, devices aim to improve the quality of living. Some future applications of the IOT are:

- 40 million people can conquer world hunger annually due to the percentage of food waste during transport.

- One million lives will be saved in Africa because of the improvement to the health care system.

- One out of 9 people will be saved from traffic accidents because of emerging mobile emergency services.

- More time will be given for commuters in developing countries.

- Billion more trees will be planted because of smart watering systems.

- 180 million children in developing countries will not drop out of school.

2.2   Internet of things in Education

IOT will invent new ways to personalize the education experience; it will add more engaging ways for the learning process through technologies like smart digital books and games. Smartboards will replace blackboards, as it provides more interaction and makes the learning process more enjoyable, Smartboards provide a smarter way to show, collect, and share information in a much faster way, thus improving the efficiency of the learning process.

Tablet and mobile devices will replace textbooks; this will help access to different materials and people with similar interest from different countries. Tablets can help children avoid back problems and health-related problems from carrying a lot of material daily to school, this issue of health problem might be overlooked by many, but lots of students in poorer areas don't have a school nearby and need to walk for long distance to reach the school.

Attendance is a major tool in the strategy of each educational institute strategy, certain attendance ratio is sometimes required to pass the subject, the new system will help make the

attendance taking process smoother, as it will minimize the time to take the attendance and prevent manipulation by students. Kajeet is a company that came to exist in 2003; it aims to empower kids with better use of technology. They developed a Wi-Fi system to be used in schools, this Wi-Fi system will be connected to school buses, providing students with a new way to submit their work while in the bus, and the new system will allow tracking of children in real-time for enhanced security. Kajeet has partnered with Google to enable rolling study halls, which is a system that aims to provide more education hours for students who live in rural areas and spend a lot of time going to school (Kajeet, 2020).

IOT will help disabled kids who have trouble learning perform better, new solutions will make their lives easier, for example, people with hearing difficulties can connect to a certain glove that will help then translate sign language into hearing sounds. A company by the name of Scanmaker in Kansas City developed a solution that can use both wired connection and wireless to quickly scan the texts from different documents, the scanned text can then be transferred to other devices like tablets, computers, and mobile phones (ScanMarker, 2020). A pen-like device is used to scan the text by passing the pen through the document, the scanned text can be translated to over 40 languages and an option of listening to the text is available. This solution can help students with eye-sight problems use their ears to comprehend the lesson.

IOT can help students with signing up for classes, paying the tuition fees, and no missing classes. Smart student ID cards can be used to gather unique information about each student. A company that uses smart cards in online education is Magicard, it provides a type of cards that uses the IOT that contains information about the schedule of classes, medical information, contact number, and any relevant information that will be helpful for students or the learning process (Magicard, 2020). Those cards provide date shredding capabilities to help secure the data of the users. Data shredding lets you delete all data inside the card and make it impossible to be recovered.

IOT can increase motivation levels among students and provide them with real-world work experience using the new technology. Sweetrush a company that is trusted by 500 fortune companies and awarded many awards in learning solutions created a virtual call center experience to stimulate a work environment with authentic examples for employees (Sweetrush, 2020).

We need skills to successfully implement the IOT. LocoRobo an American company that operates across all 50 states of America uses robots to teach developers different programming languages; they launched a robot with artificial intelligence with the name of my loopy to help students enhance their programming skills. LocoRobo also teaches students how to design and implement the IOT (LocoRobo, 2020).

Another company that focuses on improving the coding skills of children would be the California based company TYNKER. Kids use visual code blocks that they snap together to create programs. They teamed up with Mattel, a toymaker company to use the toy Barbie to teach kids coding using the doll (Tynker, 2020).

2.3 Internet of things system

IOT building blocks are important to be familiar with, as it's expected that the IOT will be a solution that is deployed around the world rather than a technology used by only developed countries. IOT is a complicated system, where all pieces work together to serve a purpose.

The aim of any solution is to be as efficient as possible; the solution should be adaptable to future changes and can be easily upgraded. The architecture part of the IOT is concerned with how the data is processed, this part of IOT is usually different from a solution to a solution, and is tailored depending on each organization-specific need. The third step comprises edge devices, those devices will process the data that comes from the gateway, and they also have visualization and analytical tools to gather insight from the data collected. The last piece in the IOT system is the data centers; they will store these insights for future applications (Patel, Scholar, Salaazr & Patel, 2016).

2.4 Challenges In front of the internet of things

One of the most important challenges to the internet of things is the amount of data that is going to be collected, and the ecosystem that should be in harmony through all phases for the system to achieve its goal. Energy consumption is a concern, as there might be a shortage of electricity, as the electricity demand will be much higher than today (Kranenburg, & Bassi, 2012).

A problem I think might face the internet of thing is getting lost in details, having too many devices that can be connected and many options to choose from, many of this will have no real-life application, therefore each solution should be tailored for the country-specific need and the question why are we collecting that data should be answered.

Labor skills are needed to make the IOT work. Electrical engineers, mechanical engineers, computer programmers, people with data analytical skills working with big data technologies like NoSQL servers, machine learning, artificial intelligence, and future technologies are all needed for future applications.

With the numbers of new devices and technologies on the rise, old devices must be upgraded. Cybercriminals are more technically skilled than the usual consumer, allowing them to use malware attacks or cookies that can capture information like passwords, credit card numbers,

private photos, private videos, and personal data. Hacker's threat will be much higher as they can attack smart homes and smart cars leading to more dangerous crimes.

Billions of devices will be connected to the IOT, this will give cybercriminals many attacking point options to attack the system, also the identification of which device is infected would be a challenge, because of the number of devices and the fact that everything is connected. Security is the number one challenge facing the IOT. Malfunctions in the system can lead to wrong decisions and cost millions to fix as everything is connected.

Using default credentials provides hackers with a simple way to attack devices. A simple way out of this problem is by educating the consumer about password and encouraging them to use hard credentials and not the default one, which sadly rarely happens (Shah, 2019). Privacy of the data should be a top priority when implementing the IOT (Mitchell, 2015); the government should have strict measures applied on service providers to protect against the use of data by third parties. The IOT can be the answer to many problems that are affecting developing countries and the education process

2.5   Gamification in education

Gamification is the process of game-thinking and game mechanics to engage users and solve problems, it's not about developing full-on games, but it's about using gaming attributes to drive engagement, strengthen skills, or behavior changes (Arnold, 2014).

Gamification is becoming a tool that is used in all sectors of life, from politics to marketing to fitness. It became a multibillion-dollar industry. Professionals predict that all areas of daily life will get tied to games (Greenwald, 2014). Games are used to promote more fun ways to achieve the desired outcome. For example, Google power meter rewards users with badges when they improve their energy consumptions. Gamification can help improve the dropout rate for students by improving interaction, fun, and motivation levels. 2.1 million Students between the age of 16 and 24 have dropped out of school in 2018 in the United States of America (NCES, 2020).

Games can make routine tasks more enjoyable and help develop habits, for example over 25 million users take care of their virtual farms daily using the game called Farmville on Facebook (Lips, 2018). Gamification can affect the education process in ways that are different from traditional means by improving emotional and social behaviors, thus improving student motivation.

One of the reasons for dropping and losing the interest in schools is the laws that each school implements, games can be a solution for this problem by rewarding people who act according to the school strategy. Gamification can be implemented in all areas of the school and not just

limited to classrooms, switching from the normal grading system into experience points like the children uses in videogames can be a valid option; this approach was implemented in Rensselaer Polytechnic Institute (Lee, & Hammer, 2011).

It's important to note that Gamification is just a tool that can be strategically implemented to provide benefits in different areas; we have to be reasonable in our approach to gain the desired outcome without it becoming just a trendy tool that provides no benefits.

2.5.1 Application of gamification

In the Computer Science Department at the technical university of Lisbon, they incorporated gamification and virtual reality into one experiment; they introduced a game called Avatar world where a character in a virtual reality world levels up according to the progression of students. The game starts in a small village but students gain rewards, unlock expansions areas, and new characters with upgradable items along the later stages. The game was done to increase student engagement to be more creative, according to the study it was a success (Barata, Gama, Fonseca & Gonçalves, 2013).

The University of Pittsburg in the United States combined mobile learning and gamification to examine if mobile gamification could help kids improve cognitive-behavioral, they redesigned an existing health system and implemented a mobile game for children as a way to improve kid's health. The application consists of an interactive game with home-based tasks and a rewards system to transfer what they learn in therapy into real-world experiences.

The introduction of the game into the system showed improvement in kid's health compared to not introducing the system although more studies are needed to improve the system (Pramana et al., 2018). An experiment that combined gamification with virtual reality, they examined the possibility of treating phobias, in this case, Acrophobia which is the fear of spiders was the phobia they wanted to treat. Comparing heart rate between those who participated in the game and others who didn't, show a significant difference (Mitruț, Taerel, Mocanu, Moldoveanu, Cramariuc & Moldoveanu, 2018) but the University of Quebec suggests that games and virtual reality can help people overcome phobias (Dietrich, 2003).

HabitRPG now known as Habitica is an application which helps you track your habits using a virtual reality role-playing game that can be tailored based on your goals, it's about building high-quality habits and getting rid of bad ones, habits can be anything from reading, smoking, playing sports, finishing homework and many more. The game lets you choose what habits you want to have or get rid of (Habitica, 2020).

Technology in the future will help overcome some educational problems that Egypt suffers from, there will be more solution created each day.Google play store has over 2.5 million

mobile apps available to download in 2020 (Clement, 2020) and technologies like IOT, virtual reality,3d printing, and gamification will only mature to provide better solutions for humans. The challenge would be picking the solution that will help Egypt overcome its education problems, and be aware of the disadvantages of each technology.

3   History OF EDUCATION IN EGYPT

Egypt is one of the earliest civilizations among countries and nations that had an early form of education, studying the history of the education system in Egypt is vital to understand what shaped the education system. Egypt civilization is the most interesting civilization to be studied because of its complex achievement because of the level of organization of such a civilization (Laurie, 1893).

Pharaonic era dates to over 5000 years old, the name pharaonic comes from the word pharaoh, who was at that time a title for the ruler of Egypt. The pharaonic era is divided by historians to three different eras that are defined by the ruler of such dynasties; those three divisions are called old, middle, and late kingdoms. The pharaonic era came to an end when Alexander the Great conquered Egypt (State Information Service, 2019). Due to the nature of those times, kids gain knowledge through imitating their parent's behavior (Strouhal & Forman, 1992). Parents were responsible to prepare children for a specific profession in the future.

Education was a right for everyone in society and it was a way to improve their social status (Szpakowska, 2008). Informal education existed where males learned from their fathers and females learned ethics, religious belief, and how to be more productive from their mothers. They separated males and females in the education process, only elite boys had the chance of being taught at what we can consider now as a school. Everyone had the right to get educated, but boys who came from a lower-ranked family stuck with the tradition of that time to get the knowledge from their parents and remained uneducated (Fisher, 2000).

The education process started at 5 and ended by the age of 16, it was expected from males to work and get married using the knowledge they gained, while females used the knowledge they learned from their mothers to manage the house, raise the kids, sew and other activities. Females from higher-ranking families were given formal education in singing, dancing, and creating music and in some cases swimming, those skills were used in ceremonies like funerals and they gave those females a higher rank in society because of their knowledge. Education in ancient Egypt was used as a form of acquiring skills to be able to perform certain tasks in the labor market in the kingdom, it was also mean to achieve more prestige's rankings in the country regardless of your background.

Most people at that time weren't able to read or write, with a higher literacy rate in males compared to females. Some queens were able to read and write. Egyptian used papyrus paper which is made from the papyrus plant to write using symbols that is known as hieroglyph. We understood hieroglyph when Jean Francois Champollion broke the Egyptian code in 1820 using the Rosetta stone, the stone had a comparative translation of hieroglyphic symbols with a Greek translation of those symbols (Robinson, 2012), and it's now in the British Museum as a part of human history.

3.1 The education process in the Greek and Roman era

Education in the Greek& Roman era had an important social role to play the life of those who came from a Greek background; it was a way to preserve their identity in Egypt (Fahim & Zoair, 2016). The context of preserving the cultural identity was of great importance, as it was believed according to Herodotus that Greeks living in ancient Egypt were considered the first foreigners in history living outside their motherland.

Greeks presence in Egypt dates back to 700 years B.C, this shows why Greeks were so eager to preserve their knowledge and culture, there was no mean of saving this kind of knowledge and tradition in Egypt because of the lack of technological advancements, the idea of a unified syllabus for all learning wasn't established yet. The Greek Preserved their identity by learning the Greek language along with Greek philosophy and culture through schools and institutions in the Hellenistic world.

The Hellenistic world is the history of the Mediterranean area between the death of Alexander the Great and the conquest of Egypt in 30 B.C (Vadan, 2009). Greek was the language in which business was conducted and the language taught at the education system, Egyptians who wanted to adhere to the Greek philosophy or conduct business had to learn Greek.

Greek& roman educational system evolved into a hierarchy like the one we have these days that teach math, arithmetic, shapes, philosophy, music, and Greek philosophy. The term school was used to describe the place where the learning process took place. The school can be a tomb; an open space, or a building. Schools were named after the teacher who gave classes, like the school of Melankomas in Fayoum. The Greeks were the first to establish the rule that the teacher should be sitting while the student should be standing answering.

3.2 Modern day Egypt

In the 19TH century, education through Egypt focused on theological teaching by Muslim or Coptic scholars, no girl's education existed at that time. Al-Azhar helped spread a type of school called el Khotab that focused on learning by repeating the lesson after the teacher using

your voice; it was the building block for the education system in Egypt (De Nooijer & Edelenbosch, 2004). Khotab schools still exist in Egypt to help to fight the literacy problem.

Mohamed Ali pasha who is considered by many as the founder of modern-day Egypt founded the first modern education system in Egypt. Mohamed Ali sent students abroad to learn from the advancements in the west and formed the first Ministry of education (Ead, 2019), successors established primary, secondary schools with the first primary school in Egypt opened at the year 1873.

The year 1921 marked the first secondary school for girls, and in 1923 education became compulsory for both genders and women enrolled in Cairo University for the first time in 1928. The free education concept was applied to schools in 1944 for primary schools and later in 1950 for secondary school (State Information Service, 2009). AT the year 1953 after the revolution, the government was obligated to provide free education up to university for all citizens.

In 1981, the first experimental school was established; those schools were used to experiment with different ways of education before implementing them to normal schools (Faksh, 1976). The first education reform program began in 1991, the goal was to improve gender inequalities, teacher's skills, and improve the education sector at that time (Shann, 1992). The second reform was in the year 2002, the ministry of education wanted to standardize the education using committees that consisted of professional, businessmen, and educators that developed a strategic plan to overcome the challenges facing the education sector.

3.3   Literacy problem in Egypt

Literacy is a problem that Egypt suffers from, the government made a lot of efforts fighting it, the literacy rate has improved from 66.3 percent to 71 percent in 2017 (Plecher, 2020). In 2017, the literacy rate among males was 76.5 percent compared to 65 percent in females. Literacy has been used as an indication to show the level of civilization, social, and economic development. Today literacy term is used to describe the lack of the ability to read or write.

Literacy exists in Egypt because of the lack of awareness of the importance of education, the economic situation that forces people to work at a young age to help their families, and also some misconceptions about the role of women in society in some areas in Egypt (Sywelem, 2015). Literacy damages the country severely; it affects the country on a political and economic scale. Literacy affects citizen behaviors in daily life situations and limits their role in society, thus for a country to be competitive in a fast-paced economy, all members of society should contribute.

Egypt can implement a similar solution in poorer areas like the one Kenya implemented using ICT to deliver classes. Linking the classes to topics that affect people's lives in that area, like farming to help them improve their daily lives while learning. We can use female role models to motivate the learning process like the approach done in Iraq, it can help women believe in their rights in education and overcome culture misconceptions. Egypt is the strongest country in the Middle East and Africa when it comes to the film industry, with a history of cinema that is more than 100 years old (Cornell University Library, 2010), using same language subtitles as a tool like in India, could help improve the literacy rate with the power of movies that have strong ties in Egyptian culture.

A satellite technology solution shouldn't be ignored, Egypt has its own NileSat, we can use a similar approach like the one used in Saudi Arabia to improve the quality of students or provide better training for educators. Another solution to provide connectivity to rural areas would be using moving satellite vans like the ones used in Pakistan.

4   EDUCATION SYSTEM IN EGYPT

According to the statistical study done by the central agency of public mobilization and statistics, Egypt has a population of over 96 million with an approximately equal distribution between males and females (State Information Service, 2018). 90 percent of Egyptians enroll to primary education; Egypt has the biggest number of the students in the MENA region, quantity over quality as we will come to this point when we discuss the problems with the education system (World Bank, 2005). Egypt has a big problem with the level of education that is provided, The World Economic Forum in the annual report for the year 2013 /2014 has placed Egypt in the 118th rank out of 148 when it comes to the quality of higher education and training (Schwab, 2013), quality of education is based on 4 indicators efficiency, effectiveness, equity, and quality (Adams, 1993). Some problems that the Egyptian system suffers from are listed below.

Teachers are paid less than 70 percent of the GDP per capita, which is one of the lowest in the world (Siscalco, 2005), while teachers in Morocco are paid 13 percent higher than there GDP per capita (Business Insider, 2019), this shows that teachers are paid less the optimum salaries and have a lower quality of living compared to other similar countries in profile, also teaching is looked down as a profession in Egypt, thus the low salary.

Class density is 43.6 students for primary education (Ghoneim, 2015), while class density in Germany is less than 21 students in 2017, Germany's population is close to Egypt in number.

Only 3.9 percent of the GDP of the country is spent on Education in 2013/2014 (Oxford Group, 2018), while Finland spends 5.7 percent of its GDP on education (NCEE, 2020). This shows how much importance is given to education in Finland compared to Egypt.

Theoretically, free education is a right for every Egyptian citizen (Library congress, 2018), but due to inadequate funding for public education (El-Baradei, 2012), harsh teaching environments, and class density, parents spend on average $ 55 monthly on private tutoring (Krafft, 2012) an amount that a lot of poorer families can't afford.

Admission to higher public education in Egypt is based only on grades (Nufiic, 2015), parents invest in private tutoring even if they are poor to provide a better future for their children (Assaad & Krafft, 2015). There is a bias undermines a great deal about the chances of transition from primary to preparatory and to secondary levels and eventually to higher education regarding education facilities (El Baradei & El Baradei, 2004). 3 percent of students who are from poor rural areas drop out of school to help fund their families (Unicef, 2015).

Education is vital for the country to compete with the technological advancements that are occurring at a very fast pace for improving the quality of living of the human race, new products and services are being created every day to help make people's lives easier. Education will help raise a future generation of thinkers, scientists, and politicians who can help develop stronger bonds with different nations with a different culture, future generation can develop a political and economic system to bring peace and prosperity for the whole world.

April 21st of 2018, Dr. Tarek Shawky Minister of education and higher education along with Minister of investment and International Relations Dr. Sahar Nasr signed an agreement with a budget of 500 million Dollars loan from the World Bank to reform the education system in Egypt (World, 2018). The reform plan is a strategic 5 years plan to change the education system, Minster Tarek Shawky came forward with the possibility of asking for a bigger loan that stretches to 2 billion dollars to help with Egypt's strategic plan for the year 2030. President Abdul Fattah el SISI at the sixth national youth conference that was held in the city of Sharm el sheik named 2019 as the year of education, emphasizing the role that education plays in the future of the company (Enterprise Press, 2018).

4.1   Egyptian education compared with Finnish education

Below is a comparison between the Education index between Egypt and Finland, it can provide a guideline on areas in the Egyptian education system that need to be improvement.

Table 1: Education index of Egypt compared with Education index of Finland

Education index Egypt	0.604	Education index Finland	0.905
Expected years of schooling, female (years)	13.1	Expected years of schooling, female (years)	18.4
Expected years of schooling, male (years)	13.1	Expected years of schooling, male (years)	16.9
Government expenditure on education (% of GDP)	n.a	Government expenditure on education (% of GDP)	7.2
Gross enrolment ratio, pre-primary (% of preschool-age children)	30	Gross enrolment ratio, pre-primary (% of preschool-age children)	83
Gross enrolment ratio, primary (% of primary school-age population)	104	Gross enrolment ratio, primary (% of primary school-age population)	100
Gross enrolment ratio, secondary (% of secondary school-age population)	86	Gross enrolment ratio, secondary (% of secondary school-age population)	152
Literacy rate, adult (% ages 15 and older)	75.1	Literacy rate, adult (% ages 15 and older)	n.a
Mean years of schooling (years)	7.2	Mean years of schooling (years)	12.4
Mean years of schooling, female (years)	6.5	Mean years of schooling, female (years)	12.6
Mean years of schooling, male (years)	7.9	Mean years of schooling, male (years)	12.3
Population with at least some secondary education (% ages 25 and older)	64.5	Population with at least some secondary education (% ages 25 and older)	100
Population with at least some secondary education, female (% ages 25 and older)	58.2	Population with at least some secondary education, female (% ages 25 and older)	100
Population with at least some secondary education, male (% ages 25 and older)	70.7	Population with at least some secondary education, male (% ages 25 and older)	100
Primary school teachers trained to teach (%)	74	Primary school teachers trained to teach (%)	n.a
Proportion of schools with access to the Internet (%)	49	Proportion of schools with access to the Internet (%)	100
Survival rate to the last grade of lower secondary general education (%)	92	Survival rate to the last grade of lower secondary general education (%)	100

Source: United Nations and Development (2019); United Nations and Development (2019a).

Years spend in studying in Finland exceed Egypt by 6 years for females and 4 years for males, female students in Finland study on average 2 years more than their male students, Thus raising awareness through campaigns done by the government to educate the public about the role of women in the society is a must, Nile Sat and radio stations can be used to deliver the message, also the use of virtual reality tool could help females get a glimpse of what the future could look like if they continue their education.

Finland provides a known budget to be spent on the education system; while in Egypt this amount is not easily accessed, we should stress that newly elected government needs to have a transparent policy and strategy when it comes to education. 30 percent of students are enrolled in pre-education in Egypt compared to 83 percent in Finland, which is a point that needs to be studied to show the effect of pre-education on the future of students and the country. We will discuss the pre-education phase in detail in the coming chapter.

Egypt's literacy rate is 75 percent while in Finland everyone can read and write. The percentage of people who engage in a form of secondary education for both males and females are 100 percent in Finland, where it's 60 percent for Egypt, showing that 40 percent of the population doesn't do any secondary education, thus not being competitive in the world market.

Implementing a distance learning solution like the one used in India could help students continue their study without compromising their work as some students need a job to be able to survive, it is unpractical to assume they will continue their studies without having a mean to live, the government should aim to improve the economy so those kids don't go to the sad route of dropping school.

All schools have access to the internet in Finland, while less than half of schools in Egypt have access to the internet, thus limiting the amount of information and the means of teaching to the capabilities of the school and providing unfair discrimination between students of different schools. One of the pillars of Finnish education is to provide an equal opportunity and fair education system to all students (Ministry of Education and Culture, 2017). Being proactive with the emerging technologies like the IOT can help overcome problems with infrastructure given the many benefits it brings to the education process; smart implementation of future technologies can lower resources used and costs in all processes of schools while improving the education quality.

Only 74 percent of primary teachers in Egypt are trained to be teachers, while in Finland they focus on the quality of the tutor where all of them have a master's degree (Reinikka, Niemi & Tulivuori, 2018). A distance learning platform could be developed to train our teachers on

skills needed to compete with the best, also a set of exams should be required to be passed for any person to be able to teach kids.

4.2   Pre-Education

Early childhood education and care (ECEC) is defined as the stage that comes before primary education, it's well known that it provides the building steps for a better learning, better development for children, and it's considered as a social right for every child in the European Union to have a good early childhood education (European Commission, 2019). ECEC is also referred to as pre-education.

Pre-Education is the first step in the Egyptian education system, it consists of public schools, private schools, and private nurseries. A lot of public schools offer a pre-education curriculum as a part of the education ladder, but it's a non-compulsory step in Egyptian education, thus, there isn't a unified curriculum in this stage.

Education is compulsory only from the age of six to the age of 14, which is the primary and preparatory stage, pre-education in Egypt starts from as young as 3 to the age 6 right before enrolling in school for primary education (Roach, 2019). Egypt is not out of the norm when it comes to the Education stage that is compulsory for education, but over 30 countries make pre-education as compulsory. Hungary education system starts at the age of 3, while countries like Greece and Switzerland make compulsory education at the age of 4 (European Commission, 2018).

Pre-education can provide a way for a better future for Egyptian kids, who suffer from a big equality gap beyond their control because of their parent's economic situation, thus impacting their future decision, lives, and minimizing their role that they can contribute to Egypt future. The least fortunate kids in Egypt have only a ten percent chance to be given early childhood education compared to over sixty percent for the more advantage one in Egypt, it's worth noting that both percentages are low compared to optimum levels (World Bank, 2020).

The gap between kids in Egypt in pre-education is highlighted by the growth of luxury private nursery schools in Egypt; those nurseries ensure a high-quality education for kids that have the means to afford them, those nurseries have very high standards sometimes exceeding pre-education quality in more developed countries, with prices as high as 60k in a country where the average salary is less than 5k (Enterprise Press, 2020). It's not official but a lot of prestige's school prerequisite those high standards nurseries for enrolling, those schools provide an advantage for their graduates as the Egyptian labor market favors those graduates.

4.2.1   Importance of Pre-Education

The European expert network on the economics of education in the analytical report for the year 2018 for the European Commission has done a great job covering the importance of pre-education for the prosperity of individual benefits and societal benefits.

The report shows why pre-education is important in improving education, labor skills, healthcare, and overall country development (Vandebroek, Lenaerts & Beblavy, 2018), below, we will summarize some findings.

Kids who had pre-education have higher educational success and lower drop rates in all education stages compared to those who didn't. Pre-education improves brain function, emotional, behavioral, and social development. Pre-education helps to lower costs and increase profits in certain domains like social security and taxation. Educated individuals are less likely to benefit from welfare options targeted for less fortune as part of the society; this will reduce government expenditure on those services, thus improving the economy.

Pre-education might be rewarding as an economic investment, as a part of a long-term strategic plan, the benefits would surpass the initial cost of investments by directly improving the GDP of the country through higher productivity. Pre-education affected small and medium-size business directly; those are usually companies that are mostly concerned with improving innovation, creativity, and creating more jobs for a better economy.

Pre-education improves children health, a study done by Dakhalia city government in Egypt to identify communication disorder at nursery schools showed that 44% had a communication disorder; they developed a special teaching technique to help those kids overcome their communication disorder while improving other skills (Gad-Allah, Abd-Elraouf, Abou-Elsaad & Abd-Elwahed, 2012).

Pre-education helps build a healthier society that connects different people from different backgrounds, leading to a more peaceful, less hating, less jealous society, it lowers crime rates, time spent in prison, and helps fix challenges because of unequal circumstances.

A report done by the European commission for improving early childhood education in Europe stated some best practices to achieve the best results from pre-education ("Early childhood education and care in Europe", 2019). Some of those best practices are presented below.

Improve the quality of the pre-education sector by following the guidelines set by the European Union for pre-education in areas like health, safety, staff qualifications while trying to improve the public sector to match the private sector. Balkans countries are the cheapest countries when it comes to providing pre-education.

Applying quality management techniques to see if the syllabus is delivering the desired outcome and encourage improvement, while Improving the relation between kids and educators through more effective interactions.

In the Netherlands polices are made to improve the image of pre-education educators, as they are considered by the public as a lower-skilled job, they started raising awareness of the public about the importance of pre-education while also improving educator's salaries (Ministry of Health & Ministry of Education, 2000). A similar approach should be applied in Egypt.

Defining rules to ease the transition between home-based provisions to pre-education, which only a few countries do. A plan should be defined to ease the transition from pre-education to the school stage, this transition lowers the drop rate, allow for higher achievements in later stages, and prepare the child psychologically for the next step (Ministry of Women and Child Development, 2019).

Developing a specific pedagogical plan to be adopted at a local level, while sharing this plan with the staff to guide their framework and develop the skills needed for the kid at early education, skills like reading, writing, digital literacy, and artistic expression should be given great care.

A Swedish study showed that studying music improved language, math, motor skills, and cultural awareness in kids (Ehrlin & Gustavsson, 2015). Another study showed that studying drama improves the individuality of kids and increase self-esteem (Tomgusehan, 2014). We should implement those guidelines and learn from those studies and tailor them to our culture to improve our children's future and the quality of living for the Egyptians.

4.2.2   Technology in pre-education

Technology is on the rise in recepunnt years, it's a tool that can be used in pre-education to achieve optimum results, but we must be cautious in using technology as young children's needs are different than those of their older peers. Children in those years learn to use all their senses and improve their social and emotional skills through interaction with elements from their surroundings (Scoter & Ellis, 2001). Children at a very young age are fast learners; technology can be used by children with emotional and physical disabilities as a way to improve their learning process (Douglas & Julie, 2002).

Distance learning is also a way to improve the qualities of future educators to meet the requirement set by governments for optimizing their role in teaching; many institutions provide some courses for free as a way to improve the quality of educators. The British council in Egypt provides a course to improve the English language; the course is targeted to educators teaching at the pre-education phase (British Council, 2020).

Studies on the impact of a web-based system on education showed that it can motivate children to learn and increase communication between kids (Olisah & Mohamed, 2015). Some professionals are concerned with the early exposure to technology for young kids, as it might limit their imagination, expose them to harmful content, and also expose them to screen for extended hours that can be harmful to them. Technology use should be wise, so we don't hurt the child. I suggest to use 3d printing technology as it don't expose the kid to harmful content, while it improves the learning process by using the kids senses in learning, an example of 3d printing that can be targeted for learning is printing of 3d organs to allow for easier demonstration for kids.

The term digital citizenship which is defined as the responsibility upon adults and children to understand the use, abuse, and misuse of technology should be familiar to anyone in the pre-education process, the awareness of appropriate, responsible, and ethical behaviors related to online rights shouldn't be ignored (NAEYC, 2012). Pre-education is the first step to improve the future of our kids, improving the pre-education system in Egypt by following the footsteps of those who accomplished the mission is a vital step towards a better quality of living for Egyptians.

4.3   Secondary education

Secondary education is the second step in the education system of Egypt, it is considered as the most important and the most complicated step facing decision-makers. It's considered so because it consists of the highest number of educational institutes in the country, the most amounts of students in all education stages and it has the only compulsory education stage for Egyptians. Egyptian law state that every citizen has to finish education up to the preparatory stage which usually occurs at age 14, the average compulsory duration for studying is 9 years, while countries like the Netherlands, Germany, United Kingdom, and Belgium all have 13 years of compulsory education period (Murray, 2020).

One of the main problems that are affecting the education system in Egypt is the rapid growth of the population of Egyptians; we are close to 100 million and with the problem of distribution of school, and some people decide to teach their young kids at home. Homeschooling is not recognized as part of the education system in Egypt, parents should enroll their kids in schools, some parents enroll their children in school but provide education at home (Farahat, 2019), thus much harsher policies should be implemented at school to disallow such manipulation.

Some professionals argue that homeschooling can be a valid option for learning; they argue that modern technology made it possible to deliver a good quality learning experience at home. Some parents argue that homeschooling was less stressful on their kids and achieved

more than going to school. The possibility of homeschooling solving some educational problems should be examined carefully by educators in Egypt in the future.

Public School:

The first type of school we will talk about is a public school; those are schools that the government supports fully with no tuition fees or in some cases nearly free tuition fees. Over 16 million students are enrolled in public school compared to only 1.7 million students in private school, those numbers are for the education year 2017/2018 (Statista, 2020).

Arabic School: This Type of school is the most common type of school, the curriculum is taught in Arabic, while English is taught as a separate subject.

Experimental Schools: Second type of public schools in Egypt, most of the curriculum is taught by English except a few subjects like religion, social studies, history, geography which is taught in Arabic. In fourth grade, a foreign language is chosen by students usually French or German, based on the student's desires.

Students at the preparatory stage can choose between general or vocational curriculum. At the secondary stage, they can choose between general, vocational, technical curriculum.

STEM Schools: This is a fairly new type of school, which is an interesting move from the government to try to develop better students for the future needs of the country. Stem schools are a project done by the ministry of education of Egypt with collaboration with the Franklin Institute. Each letter in STEM translates to a skill that the school needs to develop (Science - Technology-Engineering-Math), The project started with one school in Giza city and now the overall number of those schools in Egypt is 11 in total (Elseyad, 2019).

Sadly, this project is limited to only 11 schools distributed in different cities across Egypt, thus the general public don't even that those Schools exist, the enrollment criteria for STEM school is so competitive as students are required to have a nearly perfect score in 2 out of the three subjects (English, mathematics, and science), Stem schools are only available after finishing primary stage.

Private schools:

Private schools are privately owned school that requires tuition fees for enrollment, they consist of different types of schools, each with a different type of curriculum. Private Arabic schools are equivalent to public Arabic schools with the same curriculum applied at both types. The private language school is equivalent to the public Experimental schools; some

schools teach all subjects in French or German, unlike the public one, which only offers the curriculum in English.

International schools are schools with a foreign curriculum, the most common curriculum is the American one, it is based on teaching methods and materials developed by the United States of America, and requires passing an SAT Exam. SAT stand for Scholastic Aptitude Test is required as a prerequisite for entering college (Dictionary, 2020). The second type of curriculums that is common in Egyptian international school is, the British curriculum, it is based on teaching methods and materials developed by the United Kingdom, requires passing the IGCSE exam developed by Cambridge University, IGCSE stands for International General Certificate of Secondary Education as a prerequisite for entering Egyptian colleges (Cambridge, 2020).

Those curriculums provide a more up-to-date material and skills that are developed by countries that rank higher than Egypt in the education system; they also provide students with a chance of re-entering the exam more than once to improve the grades. The secondary education exam developed by the government is only a one trial exam; it puts both students and families on huge stress, especially those who come from a poorer background as it's their only access for a free of tuition higher education.

Some other types of education in Egyptian schools that exist regarding different curriculum that can be public or private are Azhar curriculums, it's a religious curriculum developed by Al Azhar University that is given to students beside one of the main curriculums. Azhar University is the oldest university in Egypt and regarded as the most prestige's Islamic university in the world, and one of the oldest universities in the world (Al Azhar, 2020). Some parents prefer the Azhar curriculum for religious reasons or for the quality of education at schools that are run by Al Azhar University; in 2020, over 99 percent success rate was achieved by students in enrolled in Azhar schools (Mohammed, 2020).

4.3.1   Problems facing Egyptian Schools

Bad facilities and infrastructures in school are common in poor areas, schools lack laboratories, computer rooms, health units, and in sometimes desks and chairs. Poor infrastructure led to two famous incidents of death of 2 students, one died after a window fell on him, and then a seven-year-old student at another school died when a school gate fell on him (Egypt today, 2018).

75 percent of classrooms are crowded in schools and by crowded we mean over forty students are in each class (Omran, 2020) over half the student failed the international learning assessments.

One of the biggest problems that are facing Egyptian schools is the problem of private tutoring classes, over 50 percent of students depend on them, this phenomenon was created because of the poor salaries that are given to teachers and the bad quality of teaching delivered at schools.

If you ask Egyptian families what is the hardest phase of education in Egypt, most will answer ***Thanawaya Amma.*** Thanawaya Amma are the sets of general exams in the Egyptian curriculum that leads tocollege. There are limited numbers of seats available compared to the number of students, those sets of exams put families and students under huge stress as they have to achieve a near-perfect score to be accepted in college. To show the stress that students face, it's not uncommon to have one suicide per year committed by a student because of those exams, a sad incident was when a girl jumped from the second floor during the math exams as she couldn't handle to see her future shattered because of a one-shot exam (Fawzy, 2017). Last year exams were leaked on a group that is called Shou Ming on Facebook (Enterprise Press, 2019), the group has been leaking exams since 2015.

In 2019 the government implemented online exams through a tablet in Thanawaya Amma exams, but 600000 students tablet malfunction, thus not allowing the students to finish the exam. The government acknowledged these mistakes and exams were retaken (Egyptian Streets, 2019). The governments tried to use tablets instead of books in the learning process, they had some problems during the process, technology offers a lot of benefits and is a solution that should be implemented, but this trial failed as students used tablets to play video games, watch movies during class, while some students sold the tablets. Students who should return those tablets after the end of the academic year in many cases didn't return them (Egypt Today, 2019).

The gap in quality of education between public schools is huge, thus giving an advantage for people with better means to excel; however, private schools are not perfect as the whole education system needs improvement. Dina el Odessy a Ph.D. student at Oxford University, states that higher fees for education don't always translate to better education as the training curriculum for teachers isn't well defined; schools became more of a business rather than an education institute (Mostafa, 2018). Dina stated that schools were charging kids 1000 Egyptian pounds for a trip that cost 10 Egyptian pounds, they charged entry tickets at mother day parties, and some schools charged registration fees, fees can be as high as 40000 Egyptian pounds, those are not included in the tuition fees. 40000 Egyptian pounds is equal to more than 2000 euros for just registration fees, which is higher than some tuition fees at better-ranked schools in Europe. Parents assume that paying more money will translate to better education which is not always the case, the government recently issued a law that all tuition fees should only be paid through a bank to prevent this registration fee manipulation and tax dodging.

4.3.2   Solution and Suggestions to improve secondary education

Improve the culture environment in schools, by training teachers on how to promote behavioral skills desired, it should be implemented in all school areas of school by staff and students (John Hopkins institute, 2003). We should use KPI for measuring performance and school success with a max number of 5 areas that needs to be improved at a time, the aim should to try to increase performance within a 6 weeks' time frame, the cycle of improving is then repeated for another 6 weeks, schools can choose the same 5 areas that were used in previous cycle or decide to improve other areas (Hanover Research, 2014).

The government should raise awareness about the importance of stem schools, and technical schools. We can look at the possibility of implementing chess in Stem schools and measure its effectiveness, chess has been implemented in many schools and over 30 countries as part of the syllabus (CIS, 2014), chess is shown to improve reading, problem-solving, creativity, strategic thinking, math grades, analytical thinking, and prevents racism. Chess is a cheap and fun way that can improve the quality of our students (McDonald, n.d.). When chess was applied in the province of Quebec, Students had higher marks than those of the United States of America in Math (Gardiner Chess, 2020.).

The government should change the negative picture towards vocational schools while finding a solution for students that attend those schools to work early and stops there learning process (EL-Hamidi, 2018). Raising awareness could improve the years spent in education to be comparable with other countries.

I suggest raising the sense of the importance of education between families and communities; they can fund educational projects and provide a chance of quality education for our less fortunate kids. Many schools, hospitals, and research facilities were built like this from donations; an example would be Ahmed Zewil's technological city.

Encouraging multi-ethnical races in one class with different backgrounds to eliminate problems like racism, hiring based on race or religion, and gives a sense of belonging to people for the unfortunate ones. We can encourage schools to accept a percentage of less fortunate families or kids with disabilities to increase the sense of community. Mehrstufenklasse project in Vienna of Austria implemented this strategy, ideally, there should be special teachers for those kids (Inclusion Europe, 2018).

Setting minimum requirements for teachers and provide adequate training for them in all aspects of education, the quality of teachers in Egypt are not up to the best practice standards, also we should set minimum requirement for schools to function, overcrowded classes, lack of educational materials, and a bad teaching environment shouldn't be tolerated.

Although not applicable now, I hope that in the future there would a personalized curriculum that is adjusted with the help of technology for each kid. A test can be developed to understand the student's desires and goals, and then a customized curriculum would be given for each student to help him achieve his goals and be more productive. We should find a substitute to enrollment other than the Thanawaya Amma system, minister of education stated many times that it's a step that needs to be taken, and enrolling in university should take other consideration rather than just a one-shot exam score. It's well known that forcing a college or major upon kids based only on one trial exams, will affect innovation and productivity level (Egypt, 2018).

3d printers, digital boards, tablets, and video conferences can be all used to improve the quality of education, but we should be aware of the cons of using technology, like the decline of writing and grammar skills (Alhusban, 2016). We can also learn from other innovative solutions like (MOOC) translated to Massive open online course that teamed with Coursera in 2015 at San Francisco to provide e-learning solutions like videos, active discussions online, social media learning, and online forums to the learning process. Teachers asked questions rather than explaining the material and at the end of the 6-week study, people from around the world participated in answering resulting in 6700 posts with over 66000 views (Department of Education, 2017). Another successful learning project is Hive learning network project by the Mozilla foundation allowed people and students from the same city to come together to share knowledge about learning, skills, and web literacy. Networks included schools, libraries, museums, artists, designers, and educators. A solution like the Hive learning network if implemented in Egypt, could help increase creativity and improve the years spend in education. Learning network could help divide the classroom into groups, each group would be linked to a network of interest, and this division might help improve the student per class ratio, as the learning network could be in another city or country.

4.4   Higher Education in Egypt

The Higher Education Sector in Egypt when compared to other education phases in Egypt is in a much better state., Cairo university ranks in the top 500 universities among thousands of universities worldwide, Cairo university is not located in Cairo city but GIZA CITY (Aboella, 2019). In 2017 there were 24 public universities in Egypt with some universities having branches in different cities providing 171 programs, there are 28 private universities across Egypt. The number of private universities exceeded the public just recently; there are 158 higher institutes around Egypt (Ministry of Higher Education, 2020). Those teaching facilities accommodate 122577 professors and assistant professors serving more than 2.7 million with over 70000 international students.

Some people consider higher education biased against less fortunate students, in 2005 the majority of the students were coming from a richer background (Buckner, 2013). The government is trying to tackle this problem by increasing the number of universities to reach a saturation point minimizing the problem of richer kids having better education in school, thus taking available seats in universities. The high tuition fees of private universities, make it an elite only option and not accessible by the majority of Egyptians.

Degrees are not internationally accredited except only for a few public universities who provide internationally accredited degrees, private universities usually are accredited, as they joint programs with universities abroad. The curriculum in a public university is considered by many Egyptians a much harder and more of a theoretical curriculum compared to private university curriculum that is usually developed abroad. Public curriculum lacks practical skills like the ability to give a presentation, public speaking, and researching a topic. Some hiring companies prefer graduates from private universities as they have some better soft skills, while others recognize the difficulty of the public university curriculum, thus prefers them and give them training in needed skills.

We will suggest some improvements focusing on the technological aspect to improve the higher education stage in Egypt, Higher education can also implement some suggestion that we discussed in earlier phases of education.

Keep building public universities to serve more Egyptians along with providing them with more critical thinking and soft skills. We should also update the curriculum of public universities to face the globalization of the world and make the student ready for more disruptive technology and economy.

Using technology to improve satisfaction levels like in the case of Manchester University, they analyzed students' data information to adjust things like assignments and timetables to make students' life easier (Quacquarelli Symonds, 2019). Public universities in Egypt still collect assignment hand to hand and not on an online platform

Enabling a college subscription model, where the student can subscribe for a monthly fee in another university to get a specific course or degree, this will minimize the costs of learning, students don't have to pay the full tuition fees. Georgia Institute of Technology has a subscription option for students (NYTimes, 2020). Some Universities provides high quality accredited education using e-learning. An example would be the University of the People in the United States, which is the first free full accredited University online with professors from prestigious universities (University of the People, 2020). The government could try to implement a similar approach by working with top educators worldwide to deliver a fully

accredited university in Egypt for free using an online platform, also joint programs can be developed with those free universities.

Carnegie Mellon University introduced a robot platform to try to teach computer science subjects without human interaction, thus giving a glimpse of the future (CMU, 2020).A robotic teacher can help improve the problem of dense classes, it's easier to build a robot and program it to deliver a class compared to the training of a new teacher, it's also cheaper, as robots won't demand a salary.

Microsoft has given Welcome.TU.code the best practice educational award for 2015, the Austrian instate has been offering courses in informatics to refugees that consisted of 3 designed levels courses with an ideal plan to learn informatics. Microsoft has been awarding best practices solution in education since 2011; Egypt government should follow such distant solutions in education as this solution could help overcome some of our problems (Informatics Europe, 2020). A systematic approach should be applied to deliver the educational process through technology; we should always tailor technology to the student's needs (Lauwers, 2008).

Those suggestions along with the government's efforts and advancements in knowledge and technology should help us improve higher education in Egypt.

4.5   Research Developments in Egypt

In this section, we will be talking about the postgraduate and scientific research situation in Egypt, we will discuss how improving knowledge could help Egypt transit to a knowledge-based economy rather than a traditional one.

The economy has gone through many phases from an agriculture-based economy to a manufacturing-based economy, and with the globalization of the world and the booming in ICT devices, the economy is shifting more towards a technology-based economy. Many countries have acknowledged the many benefits of a knowledge-based economy, k-economy creates new economic activities, services, and values that weren't available in the traditional economy. K-economy is not just about using computers but also aims to create new tools, new ways to conduct business to increase efficiency and empower users and workers (Hadad, 2017).

It's hard to measure how knowledge contributes to the economy, in traditional economy more production equal more economic power without the need to have a complex system to measure how other factors like design, technical knowledge, innovative solution, theoretical knowledge, and its effect of the economy. A link between researchers and business decision-

makers is needed to reach the desired outcome; knowledge should be approached as assets that need management using knowledge management skills and theories to achieve sustainability.

K-economy is characterized by highly knowledgeable workers with the ability to use information and technology to get the work done in a non-tradition way with more efficiency, thus achieving more in less time. Companies' knowledge value will be much higher than their physical assets; the value of the company will be measured by their knowledge and technological advancements rather than their physical assets. A lot of countries in Asia are shifting towards k-economy such as Pakistan, India, Thailand, Malaysia, Singapore, and, South Korea (Asia Development Bank, 2014).

It's important to improve scientific research in Egypt and help researchers as with knowledge we will be able to switch to a k-economy and create new services that will help overcome some of our challenges and improve the economy. Egypt ranks 53 internationally in the global innovation index Research and Development sub-index, this shows that the quality of researchers and graduates is relatively good, if we take into consideration how bad is the education system (Academy of scientific research and technology, 2020).

To improve innovation, we should improve both postgraduate and research qualities all while improving the education sector phases simultaneously. Egypt has 67 research facilities throughout the country (24 public universities, 19 private universities, and 24 public research centers) with a total of 22922 researchers, in 2015, researchers have done over 15000 peers reviewed studies with the highest number of researchers coming from public universities (Academy of Scientific Research and Technology, 2015). Some suggestions to improve the research and development sector were suggested in the report delivered in the Arab conference in 2006 at the library of Alexandria, major professors and calibers in the Arab world came together to improve scientific research in the Arabic world (Bibliotheca Alexandrina, 2006).

- Fixing the Shortage of research facilities and the problems of how those research facilities are spread throughout the country.

- More time should be given to researches to conduct their studies.

- Raise awareness of the importance of research and the lack of funds from both private sectors and donations.

- Tackling the brain drain problem as it's a major player in lowering the research and scientific development in countries.

- Developing policies for researchers to use their findings for commercial purposes and not just as academic achievement (Bond, Maram, Soliman & Khattab, 2011).

-   Improve cooperation and appreciation between researchers and the community.

-   Researches aren't tackling real-life problems and improving people's lives, researches are done for academic purposes only

-   Shortage of labs, libraries, and Academic references mainly in Arabic, this hinders the research process

-   Lack of international cooperation.

-   The lack of rewarding major achievements done by researchers and the lack of an evaluation method to measure how well is the research.

-   The education system doesn't' serve the needs of the research sector as the syllabus doesn't encourage students to have a scientist or innovator mentality.

-    A bias to fund research facilities that are near Cairo rather than those in different cities.

-   Improving the cultural attitude toward innovation and show that it's beneficial for Egypt's development and that it can help with problems like restricted water supplies, climate change, and agriculture development.

Those are just suggestions to further improve the research sector in Egypt but there is also a lot of success in this sector compared to the education system in Egypt.

Egypt ranks first in many research areas and among the top 5 in many others, over 50 percent of the researches is done in medicine, engineering, and the chemical sector, some examples are listed below.

Aswan Heart center an institute that was founded by Sir Magdy Yacoub a renowned Egyptian health surgeon with a research unit for treating kids with heart diseases. Ahmed Zewail city of science and technology, a technological city and university founded by noble prize winner in chemistry Ahmed Zewail to promote learning and research at the highest levels. New capital in Cairo, which is a huge project done by the government to build a new capital as big as Singapore with smart technology to accommodate over 6 million residents with investment up to 20 billion dollars. The new capital will focus on future technologies like the internet of things and optical fiber buildings (Radcliffe, 2020). We can only imagine how much can futures generations contribute to the scientific research scene in Egypt if the educational system was improved.

5   COVID 19 IMPACT ON EDUCATION AND ECONOMY

The novel Coronavirus also is known as COVID 19 had brought the global economy to its knees, coronavirus first case was in Wuhan city in the People Republic of China at the end of the year 2019 (Shrikrushna et al., 2020). This virus rate of spread is much higher than previous viruses; it has affected over 200 countries worldwide and infected over 30 million people at a certain point (WHO, 2020). The virus has led to shut down of financial markets, corporations, businesses, and events worldwide. Governments implemented procedures like social distancing to protect people.

Coronavirus made many companies implement work from home strategies, and some businesses had to shut down because some governments implemented a total lockdown on their citizens. Coronavirus allowed for fast implementation of e-learning through the world, to handle the shift in the method of teaching all over the world. The traditional way of learning is no longer possible because of the closure of educational institutes. Studying the effect of the coronavirus on the economy and education could bring some solutions to fix the education sector in Egypt.

5.1 The Effect on the global economy

Economist knew that a new economic crisis will happen (Verick & Islam, 2010), they regarded the USA economic crisis known as the global financial crisis in 2008 as the worst economic hit since the great depression.

In 2019, a lot of events worried economists, events like Brexit, the trade war between the United States and China, and the effect of the next United States presidential rally, but no one knew that a virus can be that damaging to the economy. The stock market lost over 6 trillion dollars in wealth, investors and stockholders didn't want to invest a volatile period. The S and P index, a major index in the Us stock market has lost over 5 trillion dollars in value, with the biggest ten companies losing over 1.6 billion dollars (Ozili & Arun, 2020).

The IATA known as the international air transportation association predicts a loss of over 113 billion dollars, with some airlines announcing bankruptcy (Slotnick, 2020). Governments suspended travels for touristic reasons, business reasons, immigration, and asylum. This led to a loss of over 200 billion dollars for the tourism sector, it's expected to lose over 800 billion $ this year, governments encouraged to stay home policies, hotels and restaurants had to shut down and over 24 million people who worked in the hospitality sector had to quit their jobs.

The oil war between Saudi Arabia and Russia has deepened the economical wound of COVID 19. In March 2020 Saudi Arabia requested Russia to lower their oil production to meet the new lower demands but Russia refused such a policy, in response, Saudi Arabia pumped oil at a very low price with a great number of barrels that led to a change in supply to demand ratio, thus leading to a lower barrel price. Crude oil price in the United States have reached for the

first time in history a price of $-37 for the barrel, the huge supply to demand ratio made giving away the barrel plus giving $37 to buyers cheaper than the cost of using or storing for that barrel (WALLACE, 2020).

5.2   Education during COVID 19

The virus has affected over 98 percent of students in 191 countries, a1.7 billion students worldwide were affected (Mustafa, 2020). The coronavirus affected the mental health of families, professors, and students, uncertainty about their future also didn't help (Sahu, 2020), Thus improving mental health, motivation, and positivity among students and teachers are important for education during this time.

Thanaweya Amma exams were conducted in July normally, the government couldn't postpone it or have a distance learning solution instead, the numbers of students, cheating incidents, and tablet malfunctions were all reasons for conducting the exam in a classroom, the government implemented measures suggested by the world health organization like sterilized test rooms and safe distance between students taking the exam (Kandil, 2020). The government replaced the final exams for the kg1, kg2, grade 1, and grade 2 with a report that is submitted online

Egyptian teachers, families, and students had a hard time using the internet for learning purposes, they were not used to it, and some families who came from poorer backgrounds didn't have the money to invest in a computer or an internet connection (El-Sheikh, 2020). Children had difficulty focusing on lessons, and it was easier to skip the classroom during that time, some teachers took the time to provide for parents and students on how to use the technology.

In universities, the situation was better than schools, as students are more mature and many universities implemented online learning solutions, the professors recorded lectures and providing pdf and provided materials online. Problems with the use of technology existed in poorer areas, one student commented on how recorded classes lacked the necessary interaction between students and professors. The government said that the reform plan for 2030 should be implemented at a faster rate than what was planned.

The European Commission has issued a plan in 2018 that should be implemented in the end-of-year 2020 (European Commission, 2020). The plan focuses on digital education using the advancements of technology. The plan has 11 steps with the aim of improving the education sector with the use of technology, the 11 steps are summarized below.

Improving connectivity in classrooms and universities, EU stress that connectivity is a must for future generations. Egypt should improve connectivity through satellites or service providers to provide connections to schools in rural areas.

Implementing the selfie reflection tool and mentoring tools, SELFIE (Self-reflection on Effective Learning by Fostering Innovation through Educational technology) is a free online tool developed by the European Commission to help schools with implementing technology in the learning process (School Education Gateway, 2018), Egypt should use a similar tool to help with the use of technology in the education sector, the solution should be unified across Egypt to guarantee quality.

Implement digitally signed qualifications, which are equal to the traditional degree but digitally signed, as a way to prove that certain criteria have been achieved by the student, it can help easier facilitate the life of students, governments, and administrative staff (Dedopoulou, 2018). This approach can help Egypt improve the image of digital qualification in the work environment and provide accreditation to those degrees that are more recognized.

Developing higher education hubs, Hubs are places to attract foreign students, skills, and talented individuals to increase creativity and innovation (Knight, 2011). Develop open science skills to help researchers conduct and learn from other publishing authors and peers in different areas, also raise awareness about the importance of making the resources available for different researchers (LIBER Europe, 2020).

Giving girls the skills needed to be digital leaders and inventors of new solutions, we should follow closely this step, as we suffer from higher drop rates in females compared to males, the literacy rate is also higher in males compared to females. We should implement information and communication technology in the learning process with the use of artificial intelligence and analytics to improve the learning process.

Implement EU Code Week, EU Code Week is a movement that aims to promote coding and programming skills to come up with bright and new ideas. EU Code Week is carried by volunteers called code week ambassadors (Codeweek, 2020). We should help and motivate volunteers in Egypt to contribute not only by donations but also share knowledge as it's a valuable asset in future k-economy countries. Tackle the problem of security in new smart educational institutes; it's important to prevent incidents like the leaking of online exams, or cyber-attacks.

In 2020 the EU awarded the first Digital Education Hackathon Global Awards (European Commission, 2020). The first 3 teams were awarded 5000 euro as a prize, it's an award for distinct work of the use of technology in the education sector, 1700 participants from 21countries from 5 continents were required to solve 60 challenges in a 24-hour frame. The first winner was the Mexico institute of technology and higher education, they developed an artificial intelligence solution to help team measure individual skills, and efficiency of team

workload (Digieduhack, 2020). A similar approach could be used to help with the literacy problem among poorer communities, to encourage teamwork Load and find the weakness and strength of each individual.

The second winner was from Valenzano in Italy, Ics Capozzi-Gallilie school, they developed a virtual science escape room to provide students with a real-time experience and improve their scientific skills. The science room contained many elements that provide information when interacting with them in a virtual reality environment. Science rooms can be used in STEM schools to improve the scientific skills of those talented individuals; it can be implemented easily as the numbers of schools are only 11, and one of those schools' purposes to experiment with new techniques before implementing it on the country.

The final winner was from Barcelona, the team of in lab Fib of the PolyTechnic University of Catalonia, they developed a mobile platform for students for last grade students in high school, they can use the platform to learn about their career options and interact with students studying informatics. The platform aims to motivate females to pursue higher education in informatics to improve the gender ratio in those areas and to get rid of misconceptions developed by society or culture. Solutions like the one developed by University of Catalonia could help improve dropout rates at higher education stage, and to help students get a glimpse of what they will be doing in the future, for a such a solution to work in Egypt, Thanawaya Aama must be changed as it doesn't allow students to choose university based on desires but based on a one-time exam.

COVID 19 made people recognize the gift of education and to put them in the shoes of less fortunate individuals, it is also through tough times humans come with creative solutions for a problem. Egypt should follow closely the solutions that are implemented worldwide to fight the effect coronavirus had on education and to see if a similar solution could help over Egypt education problems.

6   SURVEY TO TEST THE KNOWLEDGE OF THE PUBLIC ABOUT THE EDUCATION SECTOR IN EGYPT

This survey aims to test the knowledge of how aware the public in Egypt about the problems that the learning process in all phases is facing. This survey serves two purposes; the first is to confirm the problems of the education sector in Egypt that we covered in our research.

The second purpose is to know how aware is the public of Egypt education system, as I believe for Egypt to improve its education system, both the governments and the public should work toward this goal, especially with recent economic challenges that the world suffers from.

How aware the public of the education system, can help decision-makers decide on what technique should be used to motivate Egyptians to find a solution for this challenge.

6.1 Methodology

The survey consists of general questions linked to all phases of the learning process that we mentioned in the research. The survey was conducted online, as it allowed for gathering more responses in a shorter time, also it was hard to conduct the survey on the ground because of the coronavirus measures. The survey used social network groups to gather feedback, SurveyMonkey program was used to prevent the same device or the same user to retake the survey, thus preventing cheating and providing reliable feedback for our research.

424 responders took the survey in a month's duration; there were no criteria to choose the sample size, as the goal of this survey is to represent most of the public as much as we can, as education affects all Egyptians in a direct or non-direct way. Likert scale was used in all questions except for an optional open-end question, the reason a Likert scale was used, is because Egyptians are used to this kind of scale for measuring the quality of services throughout the country, and also to not cause any confusion while answering the questions. The open-end question aims to confirm the previous questions and to know what the public thinks are the biggest challenges facing the education system.

All questions were the same regardless of your income or demographics, but general questions about income and demographics were asked to know what backgrounds the majority of our sample represents, as it might help us with interpreting the data.

6.2 Data visualization of results

All readings represent the percentage of the sample size that chose that answer.

Figure 1: Sample Population
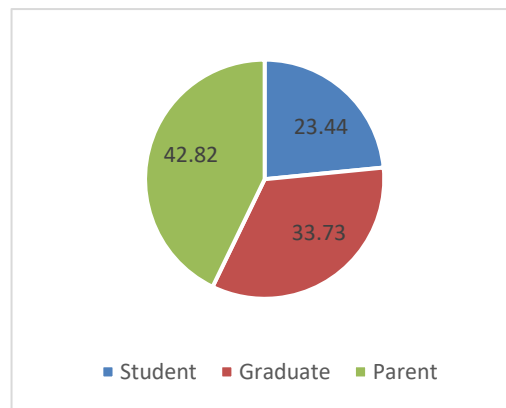
Source: Own work

Figure 2: Income
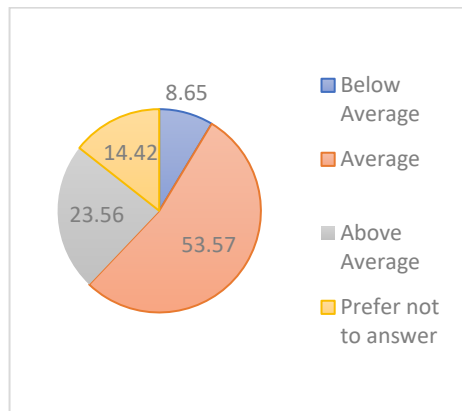
Source: Own work

Figure 3: Quality of teachers
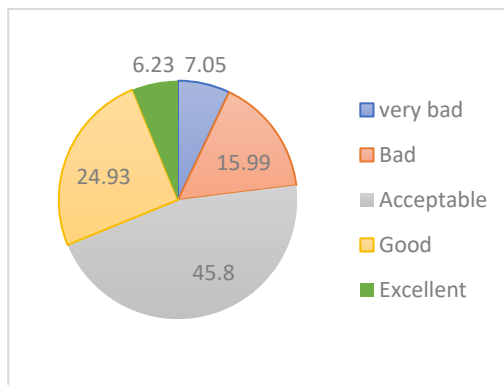
Source: Own work

Figure 4: Gender inequality
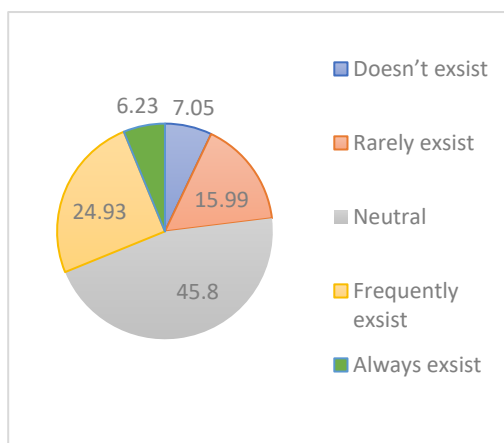
Source: Own work

Figure 5: Teacher Salary
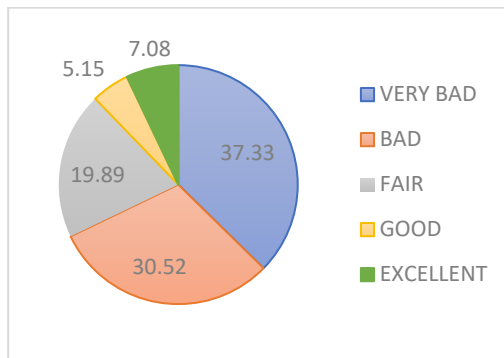
Source: Own work

Figure 6: Stress level during Thanawaya Aama
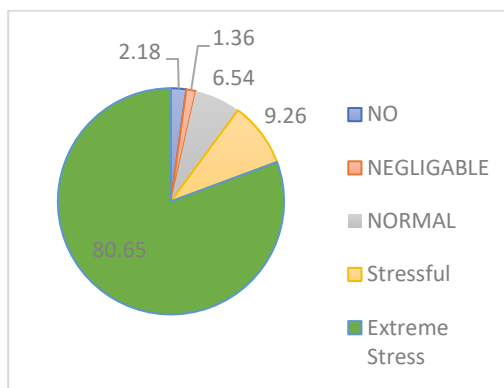
Source: Own work

Figure 7: Private tutoring and financial stress
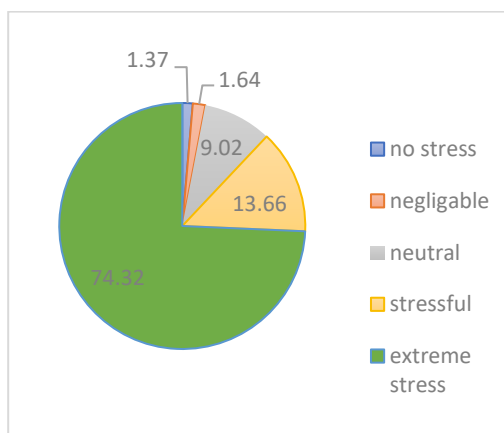
Source: Own work

Figure 8: Brain Drain effect on education
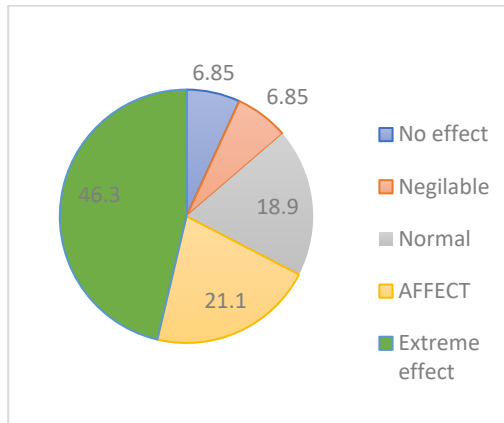
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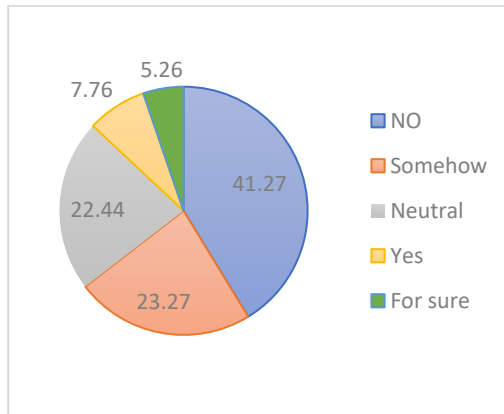
Figure 9: Requirements to enroll in International schools
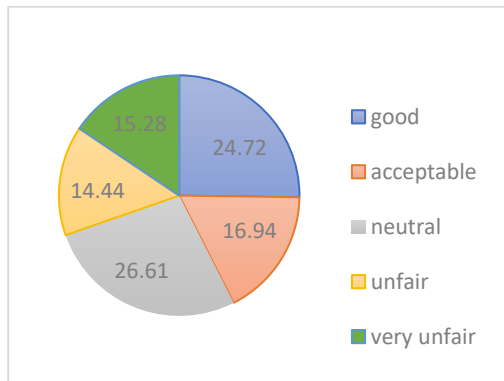
Source: Own work

Figure 10: Success rate of implementing e-learning
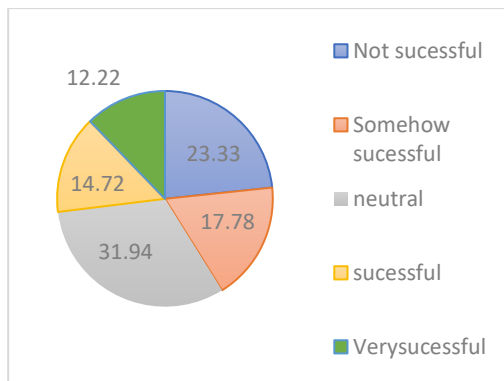
Source: Own work

Figure 11: does the education sector care about improving physical and psychological health?

Source: Own work

Figure 12: Do schools play a role in improving moral and society values
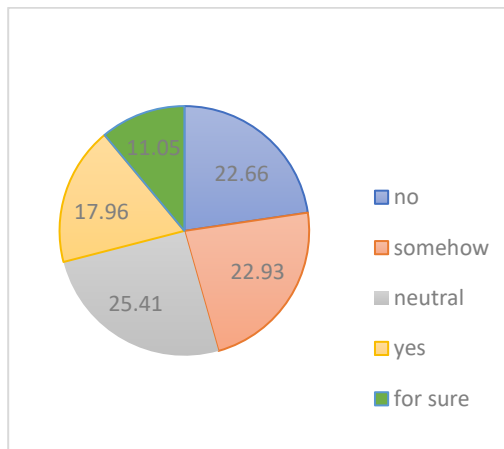
Source: Own work

Figure 13: Pre-education quality

Source: Own work

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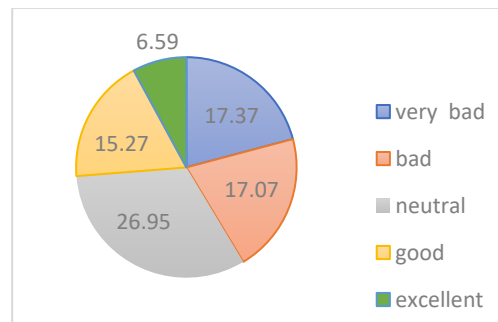
Figure 14: Gap between the private and public sector
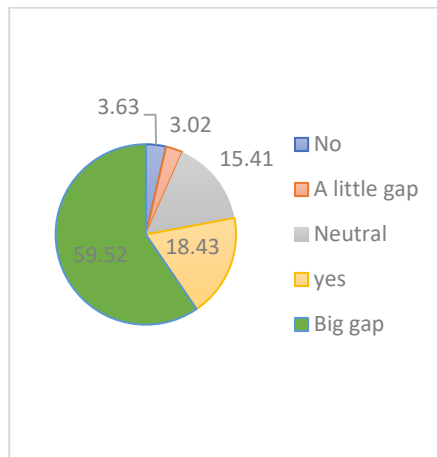
Source: Own work

Figure 15: Pre-education teaching quality
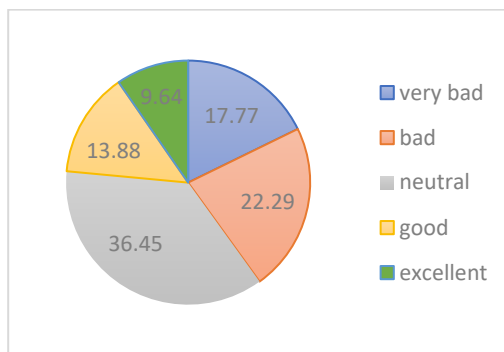
Source: Own work

Figure 16: Aware of pre-education benefits

Source: Own work

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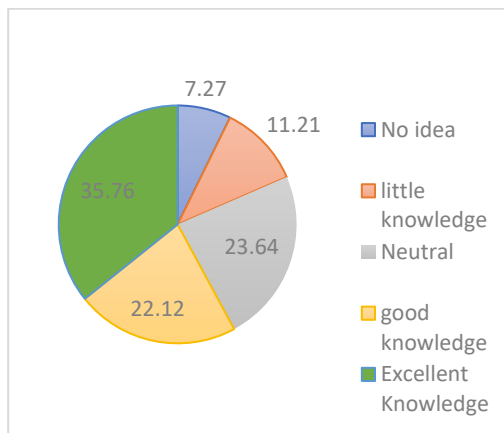
Figure 17: Prices of private nurseries
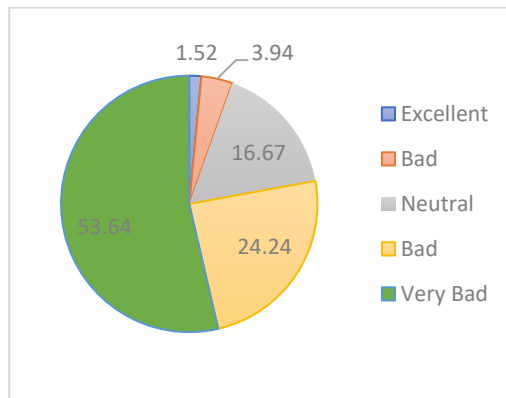
Source: Own work

Figure 18: Transition from pre-school to school efficiency
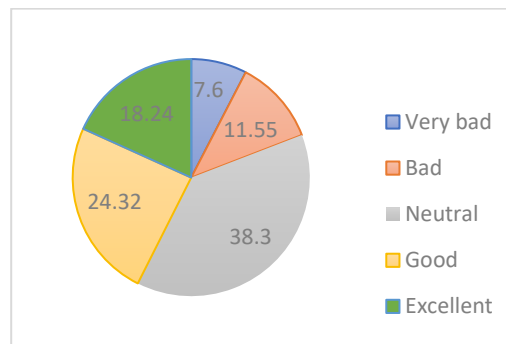
Source: Own work

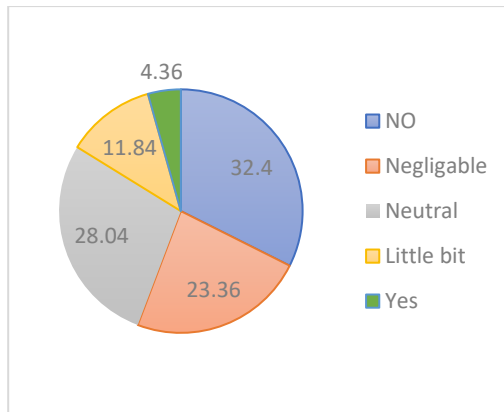*Figure 19: Do you have Security concerns in pre-education phase?*
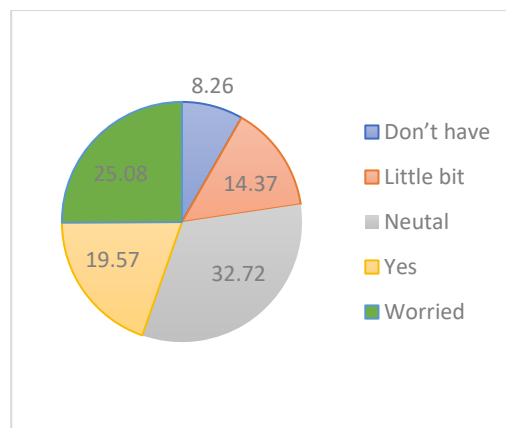
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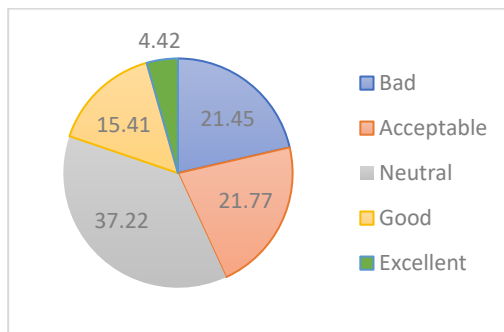*Figure 20: Is homeschooling a valid option in pre-education?*
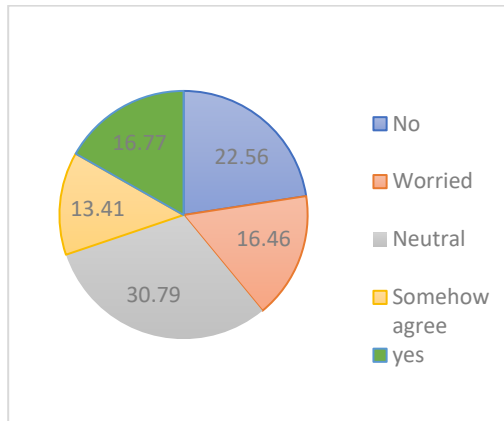
Source: Own work

Figure 21: Do degrees prepare you for jobs?
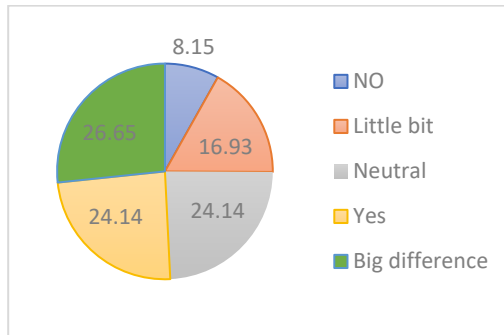

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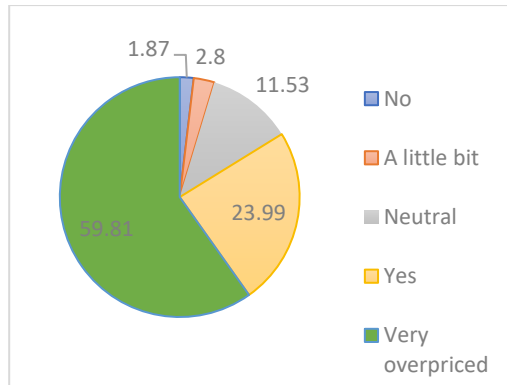*Figure 22: Quality of research facilities*

Source: Own work

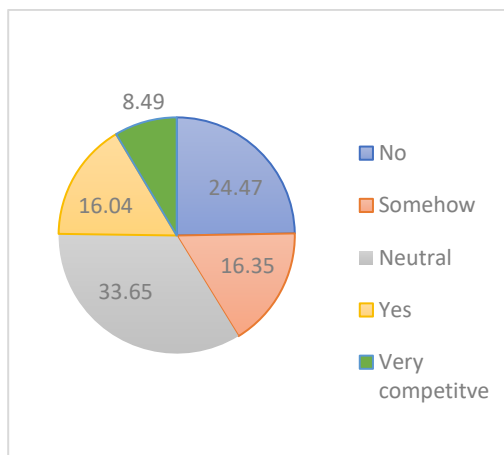*Figure 23: Are private universities better than public ones?*

Source: Own work

Figure 24: Are private universities overpriced?
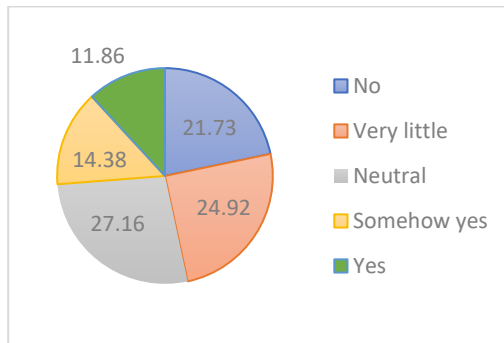

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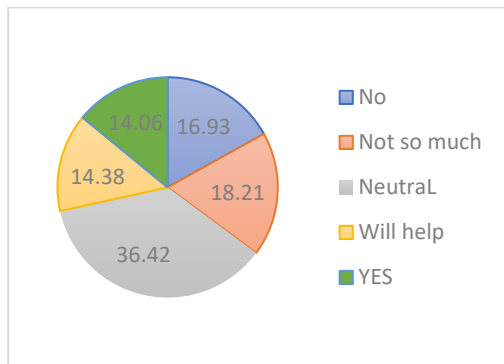*Figures 25: Are Egyptians degrees competitive globally?*

Source: Own work

Figures 26: Will e-learning replace traditional learning in Egypt?
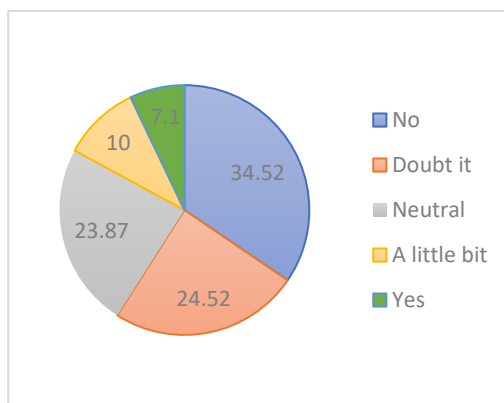

Source: Own work

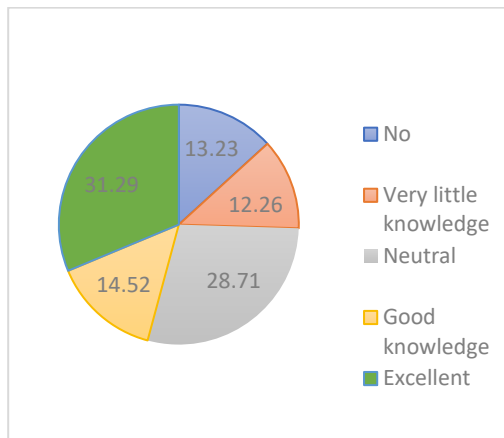*Figure 27: Will e-learning overcome Egypt education problems?*

Source: Own work

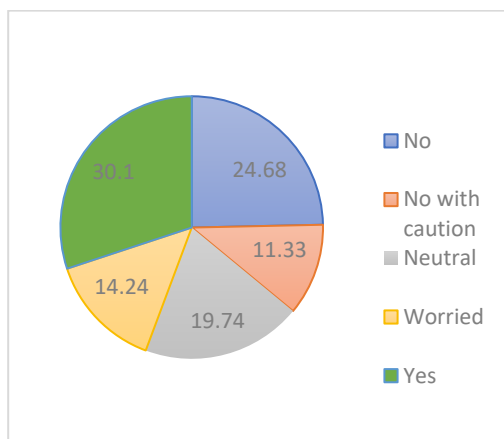*Figure 28: Are we ready to transit to e-learning?*

Source: Own work

Figure 29: Awareness of future technologies used in education

Source: Own work

Figure 30: Are you against the use of computer in pre-education phase?

Source: Own work

The last question was an optional open-end question; over 24 percent answered the optional question.

6.3   Analysis

Our sample population gives a good representation of the public, most of the sample size has a good education, we can conclude that, because most of them had an average to higher than average salary, and they were able to survey in English. When we analyze the results, we should take into consideration that the real situation would be worse or at least similar to our survey results, as most Egyptians can't speak English and the majority of our sample have higher salaries than the average Egyptian.

The majority of the sample doesn't think there is a problem with the teacher quality, while 30 percent think the quality is from good to excellent, this results conflict with our research, as when we compared the qualification of the teachers in Finland, who are required to have a master's degree to that of Egyptian teachers, who doesn't have adequate qualifications to teach, this was obvious during coronavirus period, as a lot of teachers couldn't deliver lessons with the use of technology.

Another conflicting result in our survey is that, our sample believe we don't have a gender equality problem in education, which is not the case, as the years of education for females is lower than males, and the literacy rate in females is higher than males, but again we should take our sample background into consideration, when we interrupt those answers, as those problems happen in poorer demographics.

Over 67 percent of our sample think that teachers are underpaid which is true when we compared the salaries between Egyptian teachers and Moroccans, Over 80 percent said that Thanawaya Aama puts extreme stress on students with over 74 percent saying it also puts extreme financial stress on the family, This result is because obvious when we analyze the Egyptian one trial exam for enrolling to college and how it's the only criteria to be accepted in a school, The number of students is so high compared to the number of seats available in public universities. Over 60 percent of our sample think that the recent economic hits and the brain-drain phenomena that Egypt suffers from in recent years are affecting the education quality in Egypt, thus improving our economy and trying to switch to K-economy, could help with the retaining of Egyptian calibers to help build the country.

64 percent of our sample doesn't think schools care about improving the physical and psychological health of students, while over 45 percent of our sample believes kids don't learn any moral or social values from school. A possible solution to this problem is by mixing groups of different backgrounds in one classroom, or to have a mixed class of children who have disability and healthy children, like the approach that was taken in Austria.

There were mixed answers when it came to the requirement for enrolling to international schools, it is expected as not all international schools have the same requirement to enroll. Over half of the sample thinks that private nurseries are overpriced in Egypt, which is usually a prerequisite to international and good private schools in Egypt.

Also, regarding pre-education, 60 percent think there is a big gap between the private sector and the public sector during this phase. 40 percent of the sample has security concerns about their kid's safety and health during early education, with some people doubting the learning process in this phase to prepare children for the primary school phase.

The results so far agree with our research, as the private pre-education sector prices don't reflect the quality of education offered at that price, a reason for this, is that there isn't a unified plan across Egypt for this stage of education, and every school is free to implement whatever it sees as the right approach. I would suggest having a well-defined strategy as the one Netherlands is applying to its pre-education system and making it a compulsory stage in education like some EU countries as this stage plays a big role later in life, for both children and Egypt.

Also, when asked about Homeschooling as an alternative for early childhood education, mixed results were achieved, those results are in line with our research, as some people think new technological advancements allow homeschooling to be a valid option, while others believe attending school provide necessary skills for students, and also homeschooling is illegal in Egypt.

Our sample has also mixed feelings about using computers in that stage for education. The use of computers for pre-education might provide some benefits but also have some challenges as we explained in the pre-education chapter, thus the results of the survey are in line with our research. The majority of our sample is aware of the many benefits of pre-education benefits for our child.

Over half the sample size thinks degrees don't prepare students for practical life, and that there is a gap between public and private universities. 60 percent think that private universities are overpriced; also, the majority doubts that our degrees are competitive against degrees from other countries.

It's a fact that the higher education system is suffering and need improvements, this is both confirmed by the results of the survey and the research we did about universities in Egypt. Most public universities aren't accredited and well-received in other countries except for few. Universities' curriculum needs updating, as it doesn't provide the necessary skills to be competitive with the fast-paced change of the economy. E-learning could help improve this part of the education system in Egypt as we discussed in previous chapters.

When asked about research facilities quality, 20 percent said it was good to excellent, while 40 percent said it was acceptable to bad, the quality of research facilities is bad, especially if you live outside the capital and it's not helping the researchers, as the quality of researchers in Egypt is good, unlike the facilities. 45 percent believe they have good to excellent knowledge about this topic.

When we asked our sample if Egypt will be successful in implementing e-learning solutions, and if it will be able to fix our education problems or substitute traditional education in Egypt, 58 percent believed we are not ready to implement technology in our education system, this

results might be due to the recent problem that faced the government when they tried to switch from using books to using tablets, also another incident that might have influenced the results was when tablets malfunctioned during the Thanwaya Aama exams.

102 have volunteered in the optional open-end question which is a good percentage that shows that the education sector in Egypt needs a big improvement and people care to improve this sector.

Most of the answers revolve around changing the Thanwaya Aama system, finding a solution for private tutoring; improve the public sector to match the private one, and to increase funds for research facilities. A lot of people recommend that the syllabus must prepare students for practical sand deeper analytical skills. In the end, most of the answers correlate with the findings of our research showing how much the education system in Egypt is suffering and how important the topic is, for both the government and the public.

CONCLUSION

In this research, we gave an overview of the problems facing education system in Egypt in all stages. We discussed how recent changes have damaged the Egyptian economy.

Egypt needs to look towards technology to improve the education sector, as it can provide many solutions to Egypt educational problems. Emerging technologies like the internet of things, virtual reality, and gamification along with the government reform plan for the year 2030 could help close the gap between Egypt's education system and Finland's education system.

One suggestion is that the government should involve educators and researchers more in the decision-making process regarding the education sector, as they are the most knowledgeable of the topic. One of the challenges that I faced when writing this research, is the lack of information about education in Arabic, or in some cases, the information about the education sector is not updated even in official government's websites.

Technology provides benefits regarding the learning process in all phases from pre-education to postgraduate degrees, it was shown that it can help improve gender equality, improve the learning process, lower costs, increase safety for our kids, and help tackle the literacy problem. We showed how also in this research, why education should be a top priority for the future government, as it's the main tool in improving the economy of the country, and maybe switch to a k-economy like some Asian countries are planning to do.

The problem of the education system is a very big challenge but I think with advancements of technology, the newly elected government stating education is the only way to go forward,

raising awareness of the importance of education between the general public, and following the best practices to implement them into our education system, we can vastly improve the learning process in Egypt.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

V tej disertaciji smo raziskali možnost izboljšanja izobraževalnega sektorja v Egiptu s pomočjo tehnologije. Izkazalo se je, da izboljšanjem izobraževalnega sistema ima pozitiven vplivamo kakovost življenja ljudi na vseh 8 področjih življenja, ki jih je opredelila Evropska unija.

Izboljšanje izobraževalnega sektorja v Egiptu je del načrta reform, ki ga je vlada določila za izboljšanje egiptovskega gospodarstva in njegovo konkurenco v svetovnem gospodarstvu. Reforme so predvidene za leto 2030. Minister za izobraževanje je izrazil željo da bi zaprosili za 2 milijardi dolarjev posojila za namen izboljšanja izobraževalnega sektorja v Egiptu. Izobraževalni sektor v Egiptu je eden izmed najslabše uvrščenih sektorjev na svetovni ravni. Zato je potrebno s strani države jasno določiti korake kako bi ga izboljšali in s tem povspeli na višjo revan.

V prvem poglavju smo razpravljali o možnostih in načinu izvajanja izobraževanj prek spleta. Namreč, pripovedujemo o njegovi zgodovini in razvoju. Izpostavili smo prednosti, ki jih lahko prinese izobraževanje prek spleta,kot tudi o izzivih, s katerimi bi se lahko soočili. Izpostavili smo tudi kakšen vpliv lahko ima tehnologija, kot je internet stvari in igre, in njen razvoj, na izboljšanje učnega procesa. Pokazali smo nekaj resničnih primerov, kako je bila tehnologija uporabljena za izboljšanje učnega procesa in izboljšanja pismenosti.

V drugem poglavju smo razpravljali o demografskih podatkih Egipta, vključno z družbenoekonomskimi izzivi, zgodovino izobraževalnega sistema v Egiptu, težavami v izobraževalnem sektorju v Egiptu. Poseben poudarek je na težavah s katerima se soočajo faukulteta pri izvajanju izpitov prek digitalnih kanalov (Thanawaya aama).

Naredili smo primerjavo med egiptovsko izobraževanlnim sistemom in pionirskim izobraževanjem na Finskkem. Cilj te primerjave je ugotoviti katera področja je potrebno izboljšati. Predlagali smo uporabo najboljših praks z vsega sveta z namenom izboljšanja izobraževalnega sektorja v Egiptu.

V tretjem poglavju smo izpostavili tudi trenutno situacijo glede COVID 19 in vpliv ki ga ima na gospodarstvo in izobraževalni sistem. Kako se je izobraževalni sistem moral spremeniti oziroma prilagoditi trenutim izzivom. Izspostavilo se je da je sodobna tehnologija imela glavno vlogo v tistih težkih časih, ko je najbolj pomembno zagotoviti zdravlje istočasno tudi vzdržnost sitemov. V izobraževalnem sistem je bilo uporabljenih veliko učnih rešitev, ki temieljijo na uporabi tehnologije ki pomaga pri spopadanju s slabimi učinki in težavami ki jih povzroča COVID 19.

Razpravljali smo tudi o načrtu EU za izboljšanje procesa e-učenja. EU je začela spodbujati kreativne učne rešitve z podelitvijo nagrad. Podoben pristom je bil v primeru prve svetovne nagrade za digitalno izobraževanje Hackathon leta 2020.

V četrtem poglavju smo izvedli raziskavo, s katero smo preizkusili splošno znanje prebivalstva o izobraževalnem sistemu v Egiptu. Namen raziskave je bil potrditi teoretične točke, ki smo jih razkrili v tej raziskavi in ugotoviti koliko je dejansko javnost ozaveščena o trenutnih izobraževalnih težavah v Egiptu. Stopnja seznanjenosti javnosti o tem, igra veliko vlogo, ker sem osebno mnenja da je izobraževalni problem v Egiptu tako zapleten, da za njegovo odpravo potrebujejo vključitev celotnega prebivalstva in ne samo vlade.

Sklep moje naloge je da z uporabo tehnologije in vladnim načrtom v bližnji prihodnosti lhko drastično izboljšamo izobraževalni sistem v Egiptu.

Appendix 2: Survey questions

Q1: Are you a (student/parent /graduate)?

Q2: Describe your income.

Q3: Rate teacher quality.

Q4: Describe the gender quality problem in education.

Q5: Describe the teacher's salary.

Q6: Describe the stress Thanawaya Aama puts on students and families.

Q7: Describe the financial stress private tutoring puts on families.

Q8: Describe the Brain-Drain phenomena effect on Education.

Q9: What do you think of international school enrollment requirements?

Q10: Will Egypt be successful in implementing e-learning?

Q11: Does the Education system of Egypt care to improve the health of kids physically and psychologically?

Q12: Describe the rate of school in Improving Moral and Society value.

Q13: Describe the pre-education quality in Egypt

Q14: Describe the gap between the public and private education sectors in Egypt.

Q15: Describe the quality of pre-education teacher quality.

Q16: Are you aware of the benefits of enrolling in the pre-education phase?

Q17: Describe private nurseries prices.

Q18: Do pre-education provide the needed skills to transit to the school phase?

Q19: Do you have security concerns about kid's health in the pre-education phase?

Q20: Do you think homeschooling can be an alternative in the pre-education phase?

Q21: Do universities prepare students for real-life jobs?

Q22: Describe the scientific and research facilities in Egypt.

Q23: Are private universities better than public ones?

Q24: Describe private university tuition fees.

Q25: Are Egyptian degrees competitive globally?

Q26: Will online education substitute traditional education in Egypt?

Q27: Will online education solve Egypt education sector problems?

Q28: Are we prepared to transit to online education?

Q29: Are you aware of future technologies in the education sector?

Q30: Are you against the use of computers in early childhood education?

Open–end question:

Q31: Suggest improvements for the Egypt education sector or challenges we should tackle.