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# Acknowledgment

First, I would like to express my deepest gratitude to Dr. Shebaya who through this course provided me with guidance and assistance to put this work together.

This project was inspired by mom, who sat with me two years ago as I was applying for different scholarships and told me how do you know all of this? and I remember telling her that I am doing nothing mom, I am just using the browser. She did not ask me what the browser was, but I could tell she did not know. I saw in her eyes that she wished to have known what I was talking about. I knew that because just like any other female in Yemen, she was forbidden from her own right of getting education.

I would like to dedicate this project to every Yemeni female who are everyday fighting for nothing but their rights, nothing but what they are opt to have naturally. I wish nothing by this project but to help opening a new door that shall help female students be introduced to a new field that is vital in today’s world and push their passions to a different level.

I would like to gift this project to a soul that shared this vision with me. A soul that was dedicated to fight for equality, to fight for human rights in a country where humans themselves were forgotten, to fight for the weak when it needed support more than anyone.

Finally, I would like to thank every Yemeni student, every and each one of them. While students around the world worry about what to wear the next day and where they will be gathering with their friends, Yemeni students were forced to worry about their lives, the risk they are taking just by going to their schools, the fear they have to deal with each minute they spent in the class. Despite that, Yemeni students still have the ambition to learn and dream and show resilience at an age where they are not supposed to

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# Abstract

Control-In is a program that aims to fight computer illiteracy amongst female students in the city of Sanaa, Yemen. The various reasons ranging from inequality of chance in receiving education between females and males to the very outdated education system in Yemen have all contributed in isolating female students entirely from computer science. We thought at the most feasible and approachable method of fighting this issue, and so we decided to target middle school female students in Sanaa as we believe it is the most suitable age to introduce students a whole new concept that they can find future passions in. The program will initially target the biggest 5 public female schools in Sanaa and would be a volunteering-based initiative in the first years of operation to reduce any pressure and issues faced from the governmental education sector in Yemen. We are mainly targeting UNESCO Yemen and Save the Children NGOs in Sanaa to help mobilizing the program in the first operational years as our vision includes a gradual shift to an organizational education program admitted by the Ministry of Education that we hope reaches every school in Yemen in the future.

# Overview

## Project Title

#### Control-In

An Anti-Computer literacy program for female secondary school students in Sanaa.

## Problem Statement

The non-existing exposure to computers basics among female students during the entire period of pre-university education has created a large opportunity loss as very few female students end up showing in any interest in computers and majoring in computer science fields in university.

# Current Reality

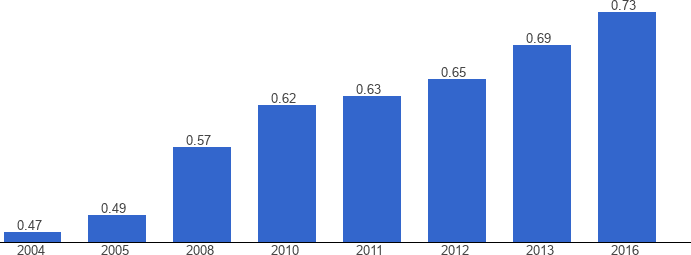
### Background on the problem, how it started and how is it now

The educational system in Yemen has been suffering for long, it is very outdated and is still relying on the curriculums made more than 30 years ago. As this problem has caused so many gaps in the education level delivered to students, computer education in particular has seen the worst one. There is no single official course offered by the ministry of education during the 12 years of school of any field of computer education, not even an introduction to the basics. Moreover, the intervention of political parties in the educational system is also a big factor in the regression of the system. The Islah Islamic party was established in 1990 after the unification of north and south Yemen, eventually forming a coalition government with the ruling General People’s Congress (GPC) and their first major project was establishing a parallel system of religious schools across the country to Islamize society in formerly socialist southern Yemen attacking by that any form of advancement that coexisted in the educational system as a support to their religious beliefs that are aimed towards the young student (Bonnefoy and Laurent, 2010). After 30 years and with no major renovation of the same system, this problem has left students graduating high school clueless of the technological world around them including the basics of computers and how they work.

The current tragic situation in Yemen has contributed significantly to this problem as the entire educational system has been crashing gradually. As the UNICEF reports found that the war in Yemen is putting 4.5 out of 10 children in risk of complete deprivation of

education [1], many schools have been bombed and destroyed, most teachers resigned from their jobs as no salaries in the governmental sector have been paid for the last 7 years, and the main concern for the ministry of education has been to provide the bare minimum requirements to keep the remaining schools operating, even at the cost of delivering poor education for students. This includes operating schools’ way beyond available capacities, keeping the focus only on the main science courses that are required for the final diploma test, and putting any efforts in establishing new courses. In addition, the lack of funds and the current economic situation have created a crisis when it comes to constructing fundamental facilities and laboratories that are efficient to deliver and keep up with the global educational requirements. The problem goes far beyond the lack of laboratories as a it was found that schools in Yemen often lack the most rudimentary infrastructure and resources such as libraries, bathrooms, proper furniture, or school books. The study found that only 61 percent of the females have a girls’ bathroom at their school, with 96 percent finding it necessary to have one. In comparison to 63 percent of the males having a boys’ bathroom and 92 percent demanding to have one. Furthermore, only 34 percent have access to a library at their school with most of these being in urban areas (Yuki and Kameyama, 2013).

As public schools continue to suffer, people have increasingly started to send their kids to private schools as they are not the ideal but a better option. Not significantly different than public schools, most private schools fail to deliver any sufficient computer courses throughout the different school levels However, most private schools do actually have computer labs and some basic training in using computers is delivered to students. The big issue is the fact that most private schools in Yemen are male only schools which grounds female students to only have public schools as an option, leading to zero exposure to any computer courses and training if existed in other private schools. This is also shown in the UNESCO numbers of the ratio between female and male secondary students between 2004 and 2016.



As the problem continues without any gestures of solving, female students remain in the same cycle of graduating high school deprived of any knowledge of the basics of computers leading to a very small number of female students pursuing computer science majors in university in a world where computer science is required everywhere.

**literature Review**

* **Bridge Model**

The BRIDGE model sought to overcome the physical, social, and cultural barriers that prevent girls from enrolling in basic schools by attempting to establish a framework and process for participatory school planning and its execution. A crucial component of the concept is how the SIP process incorporates community awareness raising. The analysis shows that the approach successfully increased both boys' and girls' enrollment. With measures put into place under the SIP, the model was thought to be beneficial in lowering barriers to girls' education, such as a lack of female restrooms, classrooms, and teachers. The psychological gap between the community and the school was also greatly reduced, and their cooperation in the process of designing and implementing the school was strengthened.

However, stakeholders found it challenging to quickly alter the situation that is driven by traditional practices and societal conventions that prevent girls from enrolling in school. It will take time for stakeholders to shift their traditional mindsets in order to modify sociocultural norms, so the local authority, especially community/religious leaders and school administrators, must support and facilitate this process. According to the endline data, the impact survey's findings indicate that the BRIDGE project was successful in shifting the principals' opinions about the educational and professional career opportunities from one that was strongly biased toward boys to one that would support greater gender equality.

The BRIDGE model, which promoted women's involvement in school activities, also placed emphasis on incorporating programs suggested by the mother's council into the SIP. Literacy and sewing classes are the two most well-known examples. It enhanced women's empowerment and increased awareness of gender issues by giving them the chance to engage in 15 school events and be involved in management decisions. A future poll should examine its effects.

The foundation of one's ability, interest, values, and beliefs are laid by basic education, which is mostly provided through elementary school. The quality of education can have a big impact on the development of one's future opportunities or disadvantages in life. Gender roles and other socio-cultural norms are first learned at home and afterwards affirmed, rebuilt, or reinforced in daily life, including the school setting. When educators' behavior and interactions with students reflect their views on gender roles and equality, it has a tremendous impact on students' thinking, beliefs, and attitudes, which together will shape the societal norms of their generation in the future.

In community-based participatory school management, the attitudes of the principals toward female empowerment and gender equality have a significant impact on whether gender equality advances or reproduces gender inequalities in society, especially in remote small communities where girls are frequently denied the opportunity to learn. To maintain the favorable trends established by the interventions and to scale up the best practices developed on the ground, institutional and administrative efforts should be maintained in the case of the BRIDGE project under strong political leadership.

* **Curriculum development and girls' education in Yemen**

According to Yemeni statistics, there is a significant gender difference in all spheres of life, particularly in education, which is crucial for both personal and societal growth. The position and status of women in Yemeni society today have been significantly impacted by this gap. Due to outdated curricula, cultural norms, and political unrest that have hampered Yemeni progress in general and women's advancement in particular, Yemeni women have found themselves at a disadvantage. Yemen has had challenging circumstances during the past ten years. Yemen went from having a generally developed civilization to having an undeveloped civilization as a result.

Some girls have benefited from formal education since it began in Yemen in the late 1960s, especially in urban areas. However, due to coeducational institutions, transportation challenges, parents who do not understand the value of education, and other issues that hinder female education, females still have restricted access to education in rural areas. Above all, societal ideas are difficult to change: the presumption that women belong at home and men are in charge persists. Due to their lack of equal rights with men in society, women are left behind. There are extremely few female authors in the Yemeni curriculum, which presents a male tone in its content and reveals strong male voices. The lack of Yemeni female role models in the country's curriculum serves to reinforce prevailing cultural norms and is a grave social injustice. It is important to view women differently and to reiterate that strong, exceptional women like the Queen of Sheba and the Queen of Arwa were in charge of the ancient Yemeni culture.

A traditional society dominated by men exists in Yemen. Reforming a few laws won't be enough to address gender disparity in Yemeni society; more is required. In order to change people's opinions of women, Tyack (2003) contends that people's minds must be changed. We must adopt a different viewpoint and stop treating women as second-class people. Similar to how Americans in general used to think that males were in charge, Yemeni culture holds that men are typically in charge (Tyack, 2003). Arab tradition often depicts seven males as first-class citizens. However ridiculous certain old ideas may be, Tyack argued, whatever gender stereotypes may be, they have historically guaranteed that men will continue to hold the reins of power (p. 71).

One of the most important tools educators have to mold children' minds is the curriculum (Ravitch, 2010). There is still a significant gender imbalance in the texts that have been included in the curriculum, despite Yemen developing and implementing a new curriculum and engaging in professional development between 2000 and 2003 (personal interactions with teachers and educators, January 30, 2012). The bulk of the curriculum committee in Yemen is male, with a tiny percentage of women, so it makes sense that the curriculum is dominated by men. As per a teacher employed by the Ministry of Education, just 12% of authors of curricula are women, compared to 88% of men (personal correspondence with a teacher working for the Yemeni Ministry of Education, January 14, 2012).

The facilities in public schools are extremely subpar, and attendance is not required. Nine years of basic education and three years of secondary education make up the current educational system. Instead of encouraging inquiry, exploration, and critical thinking in the classroom, the Yemeni educational system is based on lectures and memorization. The Millennium Development Goal (MDG) of universal primary school enrollment by 2015 is something Yemen has a chance of achieving (World Bank, 2013, para. 2). Since there are no Yemeni preschools or kindergartens in the public schools, it is difficult for young children to begin learning in first grade. Only a small percentage of kids whose families can afford it enroll their kids in private schools do so. Additionally, there are no kid-friendly instructional TV shows on the basic channels, so these kids can't even learn the alphabet from watching TV. The lack of technology in Yemeni schools is primarily due to poverty; the majority of public schools lack computers and Internet connectivity. The blackboard or whiteboard is the only teaching tool available to the teacher. The teacher is not permitted to utilize any electronic tools, including PowerPoint, the Internet, or Smart Boards. Yemen is falling behind due to these educational system flaws, which also hinder overall advancement.

* **Participatory school-based management for girls’ education (analysis of the bridge model)**

In the late 1990s, the Yemeni government began institutionalizing and expanding its capacity for community engagement. For instance, with support from donors like the World Bank and the German Agency for Technical Cooperation (GTZ)Footnote2, the government established a community participation unit in the Ministry of Education and promoted mothers' councils and fathers' councils, whose duties include caring for school facilities, keeping an eye on teacher attendance, and helping needy children at their schools (e.g., World Bank 2004; Adele 2005). Building on these initiatives, BRIDGE 1 made an effort in 2005 to create a participatory school management model that would take into account a variety of supply- and demand-side factors that influence girls' attendance at school (such as UNESCO 2003), paying close attention to community-specific contexts.

The following are the three main elements of the BRIDGE model:

First, each school has a participatory school committee that serves as a platform for community engagement. The school committee is made up of an elected chairperson, a deputy chair (the school head teacherFootnote3 will fill this position if the chairperson is absent), a treasurer, an internal auditor, chosen teachers, representatives from the fathers' and mothers' councils, sheikhs (tribal leaders), and preachers (religious community leaders), who were also invited by BRIDGE 1 in recognition of cultural barriers.

Second, with the help of school grants, school committees create and carry out yearly school improvement plans (SIP), facilitating the involvement of parents and other community members. Each year, community financial support is also welcomed but not required. SIPs encourage gender-sensitive strategies to increase girls' access to education, but the committee at each school determines the actual activities. The District Education Office (DEO) and the Governorate Education Office receive an annual report from the school committees outlining the outcomes of their efforts and finances (JICA 2011).

Third, programs for girls' education are facilitated and monitored by governorate and district education offices. In addition to conducting awareness campaigns, reviewing and approving SIPs for the distribution of school funding, local offices also offer on-site administrative support to schools during the project.

The BRIDGE concept has elements in common with participatory strategies used by other organizations in other nations to increase gender equity in access. For instance, "girl-friendly schools" (GFS), which were born out of child-friendly school initiatives supported globally by the United Nations Children's Fund (UNICEF), address barriers to gender equality at both the micro- and macro-level, ranging from the family throughout the school to the community (Mannathoko 2008). Although there may be some modifications depending on the application, this idea is generally comparable to the BRIDGE model. Evidence supports the efficacy of the GFS strategy. For instance, Egypt successfully established 711 GFSs between 2003 and 2006, with 92% of the students being female (Sultana 2008). With an increase of five percentage points more than males, three years after the program's beginning, the Burkina Faso experience of building schools with girl-friendly amenities proven to be a successful method for targeting the enrolment of girls (Kazianga et al. 2012). The BRIDGE model can help with enhancing infrastructure undertaken in the SIP, such as adding more classrooms or girls' restrooms, even if its goal is to make impoverished girls in neighboring communities feel welcome in existing schools.

The BRIDGE model, which aims to improve community involvement in the operation of a school and its committee, shares the general notion of "community schools" as well. However, if we look at the characteristic of community financing to create community schools as a rival to government supply of basic education, then it is different. Reviewing community schools in Africa, even those that have targeted underprivileged children, particularly girls, raises concerns about their sustainability and their capacity to help students overcome disadvantages and marginalization (Hoppers 2005). According to the experience of community schools in Mali, parents were eager to enroll girls if new schools were created, but gender bias reemerges when school management committees stop requiring gender parity (Laugharn 2007). The two most important factors in the sustainability of organizational structures intended to promote community participation in the supervision of local schools are leadership and social cohesion, according to a study conducted in Ghana that looked into the differences between communities beyond the lifespan of external development assistance projects (Nkansa and Chapman, 2006).

The BRIDGE model shares several characteristics with other school-based management models, particularly those that involve a school grant component controlled by a school council, in terms of the functions of the school councils. In his analysis of five African experiences, Birger Fredriksen (2007) highlights a study conducted in Mozambique, emphasizing how the grant program revitalized school councils, allowed communities and schools to decide on necessary actions to improve quality, and supported local accountability and solutions. This is also what the BRIDGE model aims to do, but in the case of Yemen, with a clear emphasis on girls' parity. In a study done in Ghana, Fredriksen (ibid.) also highlights the use of capitation grants as a relatively cost-effective method for achieving an immediate and significant impact on access to education. However, he also points out that a slightly higher grant for girls does not significantly reduce the gender gap and that a multisectoral strategy is needed to address the low enrollment of girls. In order to "sustain the changes brought about by targeted interventions that are focused at acceleration, gender-aware reform of education institutions are necessary," according to the United Nations Educational, Scientific, and Cultural Organization (UNESCO) (UNESCO 2005). Assuring financial sustainability, grant coverage, and maintenance of local support are additional difficulties and concerns with regard to school grants in Africa, some of which have been established to replace fee revenues and others to provide basic education resources.

* **2011 Crisis and 2015 war effects on the Educational Sector in Yemen**

The 2011 rebellion in Yemen and other Arab Spring countries was caused by a multitude of factors. A persistent youth unemployment crisis is a result of a broken social compact, low levels of education, with around half of youth illiterate and even those with university degrees lacking skills to be absorbed in the job market (standing at an estimated 60 percent). The protests in 2011 were brought on by a number of factors, including the drop in oil prices after 2009, which forced the government to reevaluate its commitment to increasing public-sector employment, a lack of voice and accountability, poor quality social services, high rates of poverty and malnutrition, and a multiset, tribal society. Ali Abdallah Saleh, the long-serving president, was forced out of power.

What is evident is that there have been considerably more direct losses from warfare than from humanitarian causes in this war. The impact of the war, which goes much beyond the impact of the airstrikes that are the focus of the majority of media reporting, has been reported by virtually all sources to have been significantly more than any reliable estimates of the extent of education, medical service, and employment losses. The fighting on the ground between the Houthi/Saleh forces and the Yemeni government/Saudi/UAE forces, as well as other groups like Al Qaeda in the Arabian Peninsula, tribal factions, and some ISIS elements, has caused far more suffering than airstrikes and has affected a much larger portion of the country's territory and population.

Yemen has a history of unrest, but the most recent conflict has brought the nation to the brink of a humanitarian crisis. Nearly every sector of the economy has experienced a decline in activity, but oil has been particularly hard hit. Access to social services like health and education has been drastically decreased. Following the revolt in 2011, oil production, the primary source of government revenue, drastically decreased as a result of an increase in insurgencies in oil fields and later as a result of the ongoing proxy war that began in March 2015.

In 2015 and 2016, the GDP shrank significantly by 28.1 percent and 4.2 percent, respectively. According to the UNDP Business Survey Report, a number of businesses, including 35% of service businesses, 29% of industrial businesses, and 20% of trading organizations, have halted operations. The already alarmingly high unemployment rate in the nation increased as a result. This made Yemenis' living conditions worse when combined with the consequences of hostilities on other fields (social, agriculture, fishing and livestock, trade and industry, banking system, etc.). As fiscal performance continues to deteriorate, inflation is anticipated to rise further, reaching 39% in 2015. The budget's foreign finance has virtually stopped due to the suspension of several development partners, which has led to an increase in the fiscal imbalance. In reaction to decreased oil prices, the government's declining finances, and a significant reduction in subsidies from 8% of GDP in 2011 to less than 1% in 2015, the premium on wages and salaries was reduced.

These cautions must be combined with the fact that conflict entails long-term direct human costs. In addition to creating new sectarian and tribal tensions, it also results in crippling casualties with long-term costs, children who are undereducated but are well-versed in violence, and the need to combine all of the complex governmental, social, and economic challenges of recovery with the challenge of development. The same goes for methods of dispute resolution that don't offer a viable answer to such issues. Any meaningful and cogent attempt at both rehabilitation and growth is delayed by simply putting an end to the fighting, splitting the country to establish ceasefires, and/or appointing leaders who can turn away from violence but are unable of governing well.

* **Technology and Computer illiteracy in Yemen**
  + *IT infrastructure in Yemen:*

At the start of the 21st century, having access to information technology (IT) and being able to use it successfully is essential for achieving money, power, and knowledge. One of the technologically underdeveloped and least digitized parts of the planet is the Arabic world. The Arab World is completely unable to compete internationally in the production of technology or the provision of high-end, cutting-edge services due to this technological backwardness. There are a number of factors contributing to this technical lag, including a poor IT market, a shortage of qualified IT workers, and an inadequate infrastructure. Yemen is not an exception to this norm, and there are numerous challenges facing the technological sector there.

Yemen still lacks the necessary computer infrastructure. Since there are no reliable power sources there to begin with, blackouts of electricity are commonplace. The country's telecommunications infrastructure is likewise subpar, with the majority of the population living without access to a phone line. 70% of the population lives in rural areas, most of which have almost no network connectivity. This makes information technology unavailable to a huge portion of the population and contributes to the widespread computer illiteracy.

Additionally, in a world that is changing quickly, training is essential to stay up with the advancement of technology and new advances in this field. The meager IT programs that Yemeni schools provide are extremely archaic, do not produce good academics, and do not meet market demands. Schools generally rely on faculty members from other engineering departments to teach computer courses instead of making any attempt to find highly competent lecturers or researchers in computer science fields. Even Yemeni students with bachelor's degrees in IT might find employment as teachers at the institutions from which they graduated. Low IT training is reflected in the results' poor performance, which has a significant impact on Yemen's transition to a more computerized society.

The depressing IT market is another problem that makes Yemen technologically behind other countries. The majority of businessmen in Yemen don't appear to be interested in IT goods or services since they don't seem to understand the value of computerizing their systems or how much their productivity could rise as a result. Businesses that decide to computerize their systems will probably look for a foreign provider because there aren't many well-established technology providers. The economy as a whole is impacted when we don't use technology to boost productivity, and local IT demand is little impacted. In a poor nation like Yemen, it is necessary to make the most of every resource available, and one of its greatest assets is the human brain. This could only be accomplished by building training centers and research facilities, as well as by stimulating investment in the information technology market (Al-Sharabi, 2007).

* *Impact of information technology on Productivity:*

Few theoretical studies have examined how information technology affects productivity. For example, Sobhani (2008) utilized the Cobb-Douglas Model to look at how information technology investments affected productivity at the Tehran Telecommunication Company. Since 1997 through 2007, financial and economic data were gathered in order to fuel the appropriate model. The findings showed that IT investment not only contributed positively to Telecommunication Company of Tehran's output, but that this contribution continued to do so even after depreciation and personnel costs were taken into account. The positive relationships between IT, Total Factor Productivity, and Labor Productivity were revealed by additional productivity study Sobhani (2008).

The study aims to bridge the gap between the public sector and other nongovernmental organizations by concentrating on several organizations to give a sense of the diversity of the influence of IT on productivity. The Telecommunication Company of Tehran's sample is restricted to the public sector. An additional study (Guenter, 2010) clarifies how information technology affects productivity in emerging nations. The digital divide in underdeveloped nations is the main topic of this study. By conducting a panel data regression for 33 developing nations during the period of 2002–2006, it examines whether or not more IT adoption leads to higher total factor productivity (TFP) development in developing countries. This study comes to the conclusion that adoption of IT and better levels of education are often the most important factors driving TFP growth in developing nations. It appears that the sample size of this study is too large to make it applicable to the majority of nations.

There are two research questions in this study. The first study question asks whether there is a connection between staff productivity and the aspects of IT adoption in nongovernmental organizations. The second study question asks which aspect of IT adoption in nongovernmental organizations has the biggest impact on worker productivity. The following sections provide an overview of the data analysis results and how they relate to the study questions and hypotheses. Smith (2008) conducted a poll of information technology managers' perspectives. According to the study's findings, the impact of information technology on productivity is most seen in how it enhances the impact of decentralized decision-making and advances corporate procedures.

* *Technology acceptance in Yemen:*

The majority of Arab nations, particularly Yemen, are currently battling challenges with technology acceptability [1]. One of the technologically underdeveloped and least digitized parts of the planet is the Arabic world. Yemen is not an exception to this norm, and there are numerous challenges facing the technological sector there [2]. Additionally, the literature has long explored the impact of technological capabilities on a company's ability to compete. Recent global advancements in a variety of disciplines have piqued the interest of scholars, particularly those in Yemen, in studying the adoption of technology. Technology adoption in businesses immediately improves a company's technological capabilities, which in turn increase organizational performance. The results of an organization's performance can be more effective, efficient and profitable.

In a poor nation like Yemen, it is necessary to make the most of every resource available, and one of its greatest assets is the human brain. The only way to accomplish this would be to offer an adequate developing an information technology infrastructure facility for research and training, as well as encouraging spending on the IT industry. There are numerous ideas that pinpoint the elements that impact on technological uptake. Information today Systems and technology are now crucial resources for groups to accomplish their objectives. Consequently, many theories and models of technology adoption have been built on the field

* *Use of ICT in teaching in Yemeni schools:*

Computer technology has emerged as a significant means of enhancing educational opportunities in the last ten years, yet most teachers do not employ it as a teaching strategy or integrate it into their curricula. ICT use in the classroom is influenced by a variety of factors, including non-manipulative and coercive elements in schools and employees. This is the result of several things. The presence or absence of a single component has little bearing on a dynamic process that incorporates a number of interrelated elements. To improve the teaching and learning process, it is advised that teachers create innovative teaching strategies and instructional materials.

ICTs played a very small role in the entire educational process in Yemen. ICTs were not viewed as being essential to the teaching and learning process, not even in Sana'a, the capital city. Today, ICTs have steadily forced their way into the educational process as part of the new potential for good changes due to their direct contact with society's living standards and way of life (Almutawkki, Ghurab, & Saeed, 2018). Aldowah, Ghazal, and Muniandy (2015) claim that developing nations like Yemen are sadly still far from reaping the full benefits of ICTs in education as a result of the high cost of infrastructure development and limited public access to the Internet and other ICTs. Even though the government is committed to integrating ICTs into the educational process, Yemen still faces several difficulties when it comes to learning in an online environment. According to Almutawkki et al. (2018), Yemen faces a variety of difficulties that may be categorized into major types of limits, such as teacher motivation, skill levels, and financial limitations.

Al-dheleai, Baki, Tasir, and Al-rahmi (2019) rank the Republic of Yemen as one of the least developed nations in the world. Several exceptions to the ICT integration in higher education institutions may occur, according to the current degree of ICT integration in Yemeni higher education. ICT usage in Yemeni universities is still largely up to the lecturer's initiative. The ICT-capable instructor appears to have confidence in using ICTs in his instruction. However, a professor's usage of ICT during class has no societal impact. Major barriers to the adoption of ICT in Yemeni universities include a lack of technical assistance, poor infrastructure, and basic facilitation. Universities in Yemen are absolutely devoid of any type of online communication. Accordingly, the researcher is of the opinion that upper management should offer suitable facilitation and training programs for educational settings so that faculty members can stay up to date with teaching and technological advancements in the twenty-first century.

Despite the fact that the majority of Arab nations recognize the value of integrating technology in the classroom, some Arab nations, like Yemen, continue to debate the adoption of ICT in education. Additionally, there is no study on the key elements that improve ICT use in Yemeni classrooms.

Sharafuddin (2003) claims that Yemeni educational institutions continue to face difficulties implementing e-learning or teaching-related curricula and certifying their instructors and students in the use of information technology. These challenges include a lack of capacity, inadequate information technology policies and learning plans, a shortage of specialized cadres, multiplicity, and a low level of supervisory institutions.

According to Al-dheleai et al. (2019), there are a number of variables, such as social impact and enabling circumstances, that prevent ICT use in Yemeni colleges. Other difficulties include a shortage of time, inadequate administrative assistance, and graduates with limited ICT knowledge. Therefore, the initiative and skill of the teacher still determine how ICT is used in Yemen's universities. ICT integration for instructional purposes in universities and colleges lacks an effective plan. The current enabling environment doesn't seem fit for the higher education level. As a result, Yemeni universities and colleges must take action and choose how they will include ICT into the teaching and learning process.

In Yemen, the manner in which students are taught and educated is still traditional. Private institutions may employ technology, although their utilization is still modest in comparison to how technology is used globally. Because technology can improve the quality of education, this leads to low quality students. Yemen has been noted for having a high percentage of student dropouts due to a variety of factors, including political, economic, and other factors. ICTs can generally offer interactive media to draw students and give them opportunity for group discussions, which will make teaching and learning simple and enjoyable. Additionally, this gives students easier access to related publications and reference materials.

Therefore, educators must make the most of ICT in the classroom. Technology will benefit Yemeni education if implemented effectively

# Possible causes of the issue

The poor, outdated educational system in Yemen provides zero attention to the importance of computers in the modern world.

The economic situation pushed the attention from growth and keeping to date to sustaining what already exists.

The lack of sufficient facilities and laboratories increased the gap in resolving the issue.

The lack of modern applications and use of technology in daily life created a loss of interest in computer fields among students first and administers and faculty secondly.

The inequality of chance in getting proper education and enrolling in private schools between female and male students have left female students with limited options, forbidding them form acquiring the needed basic skills and knowledge on computers.

Lack of knowledgeable computer science instructors in the school sector in Yemen

# Possible solutions

#### Aim:

Create a modern, inclusive computer program provided for female secondary school scholars exposing them to the essential mechanisms and concepts of how computers work.

#### Why the target audience?

As the long-term aim of the project extends beyond gender and academic levels to include all schools and educational sectors in Yemen, the huge gap in numbers today between female and male computer scientists push the attention to tackle the problem within female education facilities.

The program targets secondary school levels as it is the early stage where students begin to find their passions and build an idea of what they want to be in the future. Moreover, a later delivery of the course could possibly face lack of interest and rejection by students who will be introduced to a new field for the first time.

# Goal

Help female students to be more familiar with the basic concepts of computers, understand the importance of the field in today’s world, and help them find passion and possibly pursue a career in computer science fields.

# Vision

*To be an effective factor in seeing more female computer scientists and programmers in Yemen and help raising awareness and draw more attention in the educational sector of the importance of computer science and its applications today.*

# Objectives

Create a modern computer program fitting to the academic level of the students.

Establish contracts with different female schools around the city of Sana’a, the city with the highest population and number of students in the country, to deliver the program over a course of a specific time during the academic year.

Provide job and volunteering opportunities for interested computer science students and graduates especially females as it would create greater influence over the students.

Build an interactive online platform where students can access more material, helping tools and guidance from instructors in parallel to the physical course being delivered that would make the program more accessible and reaching to all students.

Working with different women empowerment NGOs in Sana’a to provide the needed help for schools that lack necessities for delivering the course. This includes; partnering with allocated centers for practicing and applying the concepts in schools that lack needed laboratories, provide experienced tutors and instructors and help delivering the material through both physical curriculums and online videos and sessions.

Providing workshops and boot camps for students during the period of the course that aims to connect the students more with the applications of computers in real life.

# Evaluation

*key Success factors:*

Exposure of the program to female students.

Active engagement of enrolled students in the program Active use of the platform amongst the students Acceptance of the program by the educational sector

Acceptance of computer science as an important field that requires more attention amongst the Yemeni society

Provision of needed training to computer instructors

More attention drawn to equality of chance between males and females in Yemen.

*Key Performance Indicators:*

Students:

Assessment of benefits among students through the test results, feedback of difficulties and expectations, surveys on awareness level on computers among students at the end of each program, instructors’ feedback and parents’ assessment.

Evaluate numbers of participated active students in relation to the numbers of students presented to the program.

Delivery:

Instructors:

Evaluate the effectiveness of the methods used to deliver the material, through students experience feedback on instructors.

Platform:

Evaluate the data of platform access and active time of users, number of downloads and shares, and user experience feedback.

Material:

Evaluate the effectiveness of the curricula through students’ tests and feedbacks, instructors experience and quality of students’ tangible projects.

## Proof OF Concept

* Brief

To test the proof of concept for Control-In, 100 surveys were made and distributed to secondary female scholars from three public schools including Rabea, Khaoula and Arwa school. Since the academic year have not started yet and due to the high difficulty of conducting this research online, efforts were made to bring students to schools to fill the surveys and the sample size was reduced from 500 to only 100 students that were able to come in summer.

* Survey

The survey included 21 basic question that were chosen by an academic advisor, Dr. Abudlmalek Momen, who is the head of Mechatronics Department in Sanaa University, and they were all extracted from the basic concepts that are taught for secondary scholars in the IGCSE computer science curricula.

Moreover, to test how students feel about the level of their existing computer programs in schools and how they would perceive having a better advanced program, 5 more questions at the end of the survey were added that focused mainly on students’ needs for a better computer program.

The first part of the survey that included the conceptual questions had 4 possible answers for students to choose from. In each question, students were asked to of how much they knew about each concept and were optioned; Nothing, a little bit of information, a lot of information, everything about the topic. Students were further asked to fill an explanation section had their replies were different than Nothing. On the other hand, the 5 assessment questions had the students reply to 4 options when asked of how much they agreed to the statement given, or how much they looked forward for the proposed statement, the possible replies were; Strongly, Somehow, no, I don’t know.

* results
  + Students level:

As expected, and proposed earlier, the results obtained from the conceptual part of the survey strongly supported the claims of students not having any exposure to the basic computer concepts taught in most schools around the world today. The results showed that out of 2102 replies, 1918 were; ‘Nothing’, forming up 91.2% of the entire sample output. Moreover, out of the remaining 184 reply, 118 replies were classified as wrong for the option: “some information” and one reply were classified wrong for the option “a lot of information”. This formed up 65% of replies different than “Nothing” to be wrong. All these numbers are further analyzed in the attached file below and show the strong relation between our proposal and survey results.



* + Assessments of the program:

The results of the 5 assessment questions could be summarized into the following

* + At 19, Do you want to be a programmer in the future had the highest Sum of Somehow and was 171.43% higher than do you want to learn how computers work, which had the lowest Sum of Somehow at 7.
  + Sum of Somehow and total Sum of Strongly are negatively correlated with each other.
  + Do you want to be a programmer in the future accounted for 30.16% of Sum of Somehow.
  + Across all 5 Question, Sum of Somehow ranged from 7 to 19, Sum of Strongly ranged from 63 to 91, and Sum of No ranged from 0 to 11

The results strongly suggested that students were not happy with their current computer programs and were excited to enroll had a new computer program is to be established in their schools. Furthermore, as shown by data, that students who had no interest in going into Computer Science fields in undergrad studies, also showed significant desire to enroll in the program. Further details of the data are shown in the file below.



# Action Taken and Activities

*Management of the project:*

An initial team of volunteers of the following members will be formed first;

general coordinator (responsible for coordinating the work between the different team members and ensuring every component of the program is doing its job)

Resources manager (responsible for the deliverables from curricula, videos, books…. etc.)

Relations manager (responsible for the coordination between the schools, partnerships with the test centers that will be needed, partnerships with the NGOs that will also be needed to help expanding the program, managing social media platforms to raise awareness about the program and handling the marketing plans…etc.)

Academic supervisor (responsible for managing the academic progress, assessing the level of delivery, creating the tests and managing the materials on the online platform, recruiting volunteer instructors…etc.)

Finance manager (responsible for fund raising, financial management of the program including the budget for the resources, growth plans, marketing plans

…etc.)

*Establishment of the project:*

A team of computer science graduates and instructors from Sana’a Soft, Sana’a University, and Technology and Science University of Sana’a will be consulted to develop an appropriate curriculum for the different three school levels targeted.

The curricula will be made with reference to the international standards such as the K-12 computer program in the US, New Zeeland’s computer programs for secondary schools such as Wanaka Code Clubs, the IGCSE computer Computer Science - 0478 and 0984 programs.

In parallel to establishing the curricula, an online platform will be developed that would be used to announce updates, electronic material, events and workshops, activities and so on.

The platform will be mainly developed by the program team and with the help of additional programmers if needed.

After having the curricula and platform ready, partnerships with schools will be established and would include initially the 5 biggest female schools in Sanaa Including; Arwa school, Balqees School, Aisha School for Girls, Seventy Martyrs School for Girls, Rabea Aladwia school for girls.

The initial five schools were chosen based on the number of students and availability of computer labs as all of these schools are equipped with efficient computer labs that shall satisfy the program requirements for the first operating year.

Volunteers will be recruited for the delivery of the program and will be chosen by the Academic advisor. In addition, qualified computer instructors in the chosen schools will be asked to join a one-week info sessions and training about the program upon their will and participating instructors who joined the program will also be part of the delivery of the program each in their specific school.

Partnerships with test centers such as New Horizon Institution for Computer and Languages and Cardiff Institution for Languages, computer and human resources development will be made for the purpose of hosting the workshops and tests that are part of the program.

*Additional Activities:*

Regional competitions among participated schools will be conducted that includes the top students among each school and the winners will be awarded with different prizes including financial prizes such as money and laptops and development prizes such as scholarships to computer and language institutions.

Team projects will be included as part of the program made to build team work and communication skills among students. The team with the best project will be awarded and further trained to work on bigger projects.

Professional Training and workshops within companies around the city and with the program supervision will be made throughout a specific period of the program to project the learning objectives on the practical life.

Weekly quizzes and games will be posted through the online platform and students to first solve them will be highlighted in the website and awarded with certificates and other prizes.

*Growth of the project:*

Aim:

*Exponential growth of schools included in the program over the city of Sanaa after the first year. That is to include 25 schools in the second year and 100 in the third year and so forth with a goal of including all public schools in the capital within 5 years of establishment.*

Tools:

Partnerships with the big NGOs such as the UN Women, Save the Children and UNICEF Yemen in the city of Sana’a after assessing the success of the first year and presenting tangible outcomes of the program to provide funds for expanding the program in the following years including; providing computers to schools with shortages, providing print materials, conducting awareness campaigns…etc.

Expansion of the program to include more workshops, boot camps, volunteers and team members

Introducing summer camps and intensive summer programs for students after assessing the success of the first using the success metrics specified.

Establishing more practical events including regional competitions among program schools

Expanding the scope of the program to include high schools.

Partnering with private universities to establish future scholarships for top students in the program

# Activity Plan Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | (2023-24) | (2025) | (2026-30) | Remark |
|  | Team formation | Team Expansion through added members, and gradually shifting the management from a volunteering-based structure to an organizational structure. |  |  |
|  | through direct | Organizational | Gradual shift |
|  | communication | structure based | from volunteer |
|  | with interested | on full time and | based NGO to |
|  | and qualified | part time | Organizational |
|  | volunteers | positions. Less | structure parallel |
|  | through women | dependency on | to growth of the |
| Team Building | empowerment | volunteers on | program. All |
|  | NGOs, youth | the | members remain |
|  | NGOs, | management | effective part of |
|  | University and | scale. More | the NGO with |
|  | High School | added expertise | more suitable |
|  | Students with | and professional | positions and |
|  | leadership | team members. | responsibilities. |
|  | qualities. |  |  |
|  |  | Emphasis on Evaluation of current deliverables. Research and development to maintain up-to- date material. | Emphasis on evaluation of material and suitable changes on the deliverables with each update made. | Consistency and |
|  |  | smooth updates |
|  | Formation of the | to the curricula |
|  | curricula based | to insure |
| Curricula development | on academic  expertise and different existing | regularity of  delivery among the different |
|  | programs in | levels of |
|  | other countries. | students |
|  |  | enrolled in the |
|  |  | program. |
|  |  | Evaluation of |  |  |
| Platform Development | Creation of the online Platform using team expertise and professional assistance. | collected data, user experience, effectiveness of the platform through logs numbers, shares, downloads of  posted | Emphasis on update and development of the platform. | Continuous data collection and users experience feedback for research and development of the platform |
|  |  | materials. |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | (2023-24) | (2025) | (2026-30) | Remark |
|  |  | Expansion of |  |  |
|  |  | enrolled schools |  |  |
|  |  | up to 25 schools |  |  |
|  |  | in Sanaa. Reach |  |  |
|  |  | out to |  |  |
|  |  | international | Expansion of |  |
|  |  | NGOs including | Enrolled schools |  |
|  |  | UNESCO | to 100 schools |  |
|  |  | Yemen and | in Sanaa. | Strong focus on |
| Social Mobilization | Initial contact and partnerships with beneficiary schools and local Women Empowerment and youth NGOs | Save the Children for added mobilization value and increased effect in the  educational | Emphasis on normalizing the program amongst the education sector.  Emphasis of  getting | the dependency of NGOs effect to legitimatize the program and form pressure on the educational  sector to provide |
|  |  | sector. Reach | governmental | support |
|  |  | out to the | credibility from |  |
|  |  | governmental | the ministry of |  |
|  |  | educational | education. |  |
|  |  | facilities and |  |  |
|  |  | Ministry of |  |  |
|  |  | Education for |  |  |
|  |  | added support |  |  |
|  |  | to the program. |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | (2023-24) | (2025) | (2026-30) | Remark |
|  | Recruiting | Focus on recruiting more volunteers as the program expands to include more schools.  Emphasis on including female instructors for better image creation among female students. Focus on evaluating current training program through instructors’ feedback. | Emphasis on providing sufficient staff and instructors in parallel to the increased need. Focus on facilitating the training program for insured accessibility among all instructors including different training centers around the city and segmentation of areas covered for better communication. |  |
|  | volunteers |  |
|  | including |  |
|  | qualified high |  |
|  | school and |  |
|  | university |  |
|  | students and | Focus on |
|  | graduates and | training |
|  | providing them | instructors in: |
|  | with necessary | Experimental |
| Volunteers Selection and Training | training. Additionally, providing  existing | learning, Differentiation, Blend Learning,  Game-based |
|  | computer | learning, |
|  | instructors in the | Student- |
|  | enrolled schools | Centered |
|  | who are willing | learning. |
|  | to participate in |  |
|  | the delivery of |  |
|  | the program with |  |
|  | the needed |  |
|  | training |  |
|  | program. |  |
|  | Initial contacts | Focus on getting the support of UNESCO  Yemen to support the program and help mobilize it. | Focus on getting governmental legitimization and support and admitting the program to the Yemeni education system. | Crowdfunding, Target businesses and provide marketing in return of donations; laptops, print material…etc. Target Individual donations. |
|  | with NGOs and |
|  | youth supporting |
| Financial Managements and Funds | initiatives to initiate the program and  start the |
|  | development of |
|  | curricula and |
|  | platform. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | (2023-24) | (2025) | (2026-30) | Remark |
|  | Evaluation of the |  |  | Goal-based Process- based Outcome- based Systematic approach for collecting, analyzing, and using information to measure efficiency and effectiveness. use of models such as the Krickpatrick model to evaluate the effectiveness of the instructors training program |
|  | current state of |  |  |
|  | the problem | Evaluation of |  |
|  | through different | first operational |  |
|  | surveys and | year. Compare |  |
|  | questioner | the expected | Evaluation |
|  | among school | results and | phases |
|  | students. | actual results | continued each |
| Monitoring and Evaluation | Expected results to be set for the  first operational | obtained. Compare the  expected state | year. Emphasis on updating  evaluation |
|  | year. Evaluation | of the program | criteria with |
|  | of the current | management | each operational |
|  | state of the | and the current | year. |
|  | program | one and make |  |
|  | management | necessary |  |
|  | and expected | assessments. |  |
|  | state for the next |  |  |
|  | year. |  |  |

## Funding

Since we are dealing with an educational program in a developing country with an ongoing war, the focus will be to target international funding organizations in the country as a main source for capital needed by the program. Additionally, private institutions attraction, individual funding and crowdfunding are all methods that will be used to gather funds as well. In general, the following structure will be followed to gather funds;

* OCHA and Save the Children:

In the past 8 years of war, both OCHA and SC were the highest donators to local NGOs in the country. Their funds included numerous educational initiatives in all 21 cities of Yemen. Control-N will make contact and present its proposal for both OCHA and CS, along with the detailed budget requesting funds and facilitation services that are provided by such organizations.

* Private Companies:

Usually, such programs attract big commercial companies especially in Yemen, where it creates a great opportunity for such companies to advertise in exchange for funds. Such funding was noticed before in a very similar project; Jamal Abdulanasser High School for Intelligent Students; which was mostly funded by private companies in the country in return for online advertisements in the school website and printed logos in the curricula. Similarly, we will work on gathering as much of private funds and facilitate our online platform to make it appropriate for advertising in order attract these investors.

* Crowdfunding:

the financing of the workshops and boot camps through the use of modest investments from a large number of people. By extending the investor base outside the conventional block of stakeholders, crowdfunding would utilize the widespread networks of individuals that are easily accessible through the project's online platform and crowdfunding websites to bring financiers and city officials together.

* Other potential sources:

Include:

UNESCO Yemen and Ministry of Education depending on level of cooperation with the program

MEPI Alumni Venture Fund

Alumni Engagement Innovation Fund (AEIF) grant

UNDP, UN

Individual Funds; targeting big businessmen in the country such as Hael Saeed corp. owners that are known for funding such initiatives in the past.

## Marketing Strategy

Our marketing strategy will primarily be divided into two phases detailed as follows;

* phase 1: Pre-Launch
  + Goal:
    - Raise awareness on the program goals and vision amongst the educational sector.
    - Familiarize as many secondary school students with the program and especially in the targeted schools.
    - Introduce the program needs and training facilities to as many computers science graduates and students that are potential volunteers.
  + Objectives:
    - Use of social media platforms and paid advertisements to spread the word and briefly introduce our program
      * this would include posts, articles, videos, sponsorships to other pages famous amongst students…etc.
    - In-school marketing campaigns, that would be conducted during the preparational year and will include small in-class introduction of the program to the students
    - In-University marketing campaigns, that would target different classes of Computer Science and Engineering departments informing of our

program and training and volunteering opportunities that will be provided.

* + - provision of free of charge demo sessions that will be open for all students targeting specific computer science topics each time.
* Phase 2: After Launch
  + Goal:
    - Link the program progression directly with the funders at a very consistent level
    - Widen audience reached to include other cities and schools
    - Getting NGOs support in the marketing plan and as a main stake holder that shall left the mobilization level significantly
    - Ensure use of the online platform as a main factor in the marketing plan
    - Ensure reach out of updates to Ministry of Education and UNESCO Yemen Increasing legitimacy of the program
  + objectives:
    - Weekly reports to be filed with detailed operational information and stats to the funders of the program.
    - Increase circle of in-person informing sessions and campaigns in a larger number and scale of schools.
    - Use of fast and direct media platforms such as live session streams, TV shows and interactive online sessions.
    - Increase quality of marketing through the online platform through increased online advertisements.
    - Maintain good contact with Ministry of Education and UNESCO Yemen, keeping them in the circle with each update
    - Maintain the focus on publishing successes of the program events, objectives and operations throughout the different media platforms
    - Initiate workshops in partnerships with different companies in the country that include student participation and maintain good publicity of such events
    - Increase numbers of open boot camps and online sessions
    - Increase number of free training sessions of volunteers

**Budget**

The following is a summary of the detailed estimation of the budget proposed to initiate

*Control-IN.*

|  |  |
| --- | --- |
| **Project and Initiative** | Cost |
| Material Development | $10,000 |
| Platform Development | $5,000 |
| Research and Evaluation | $2000 (per month) first year |
| Staff expansion and onboarding | $5000 (Per month) 1st year  $25,000 (per month) 2nd year  $50,000 (Per month) 2025- 2027 |
| Office Rent | $1000 (per month) |
| Platform Sustainability | $1000 (per month) |
| Social Mobilization | $2000 (per month) first year |
| Test Centers and provided facilities | $5000 (per year) first operational year $25,000 (per year) Second year $35,000 (per year) 2026- 2030 |
| Additional Activities Budget | $3,000 (first year) $10,000 (second year) $20,000 (2026) |

# TimeLine



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