

Case Study

Empowering girls through IT and Coding education in Iraq: an innovative learning pathway for secondary school girls in Shatt Al-Arab, Basra



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Abstract

In the Middle East and Northern Africa (MENA) region, despite school enrolment is higher today both at primary and secondary levels than one decade ago, significant differences remain in the education opportunities for female and male students (or in the way male and female students can profit from the same educational opportunities). This is the case of Iraq, where school is mandatory up to the age of twelve and the literacy rate for female and male youth (15-24 years old) is almost the same, with a 92.10 rate for females, and 94.90 rate for males (World Bank, 2020). However, this data does not always account for stark regional differences within the country and for structural, social and cultural barriers that prevent girls from fully and equally accessing and completing their education, as well as participating in the employment sector, or also in the society as a whole.

To address this issue, Mercy Hands for Humanitarian Aid, in partnership with Mercy Hands Europe and with the support of the Canadian Fund for Local Initiatives has implemented the innovative “Boosting the technology skills of girls in Basra, Iraq, through IT/coding classes” project in Basra, Shatt Al Arab District, benefiting both schoolgirls and teachers. The project goal was to empower girls by enhancing their IT/coding skills, and train teachers on IT/coding in public schools in Shatt al-Arab.

This paper provides an overview of the education challenges in the MENA region, Iraq and within the specific context of Basra, and aims at highlighting the positive impact of IT and Coding education projects and activities for empowering girls and women, within education interventions in developing countries. The paper also highlights the main findings from the data collected in the locations of the project, sharing lessons learned, while building the evidence of the positive and multidimensional impact of IT and Coding education activities for girls and women, that could be repeated and expanded also in different contexts.

Girls' education in the MENA region: recent trends

When it comes to girls accessing education in the Middle East and Northern Africa (MENA) region recent data shows encouraging signs of progress in the region: primary and secondary school enrolment tends to be higher in MENA countries compared to the last decade, and women in MENA countries are also more likely to enrol in universities than they were in the past (Roudi-Fahimi and Moghadam, 2006). According to the World Bank's recent data, in the MENA region in 2020 the literacy rate of the youth population (people aged 15-24) was 90.33%, with the female youth rate (88.24%) almost equal to the male youth one (92.30%) (World Bank, 2021).

Moreover, a recent study by UNESCO positively indicates that education in science, technology, engineering, and mathematics (STEM) fields is higher in the Middle East in comparison to the West, as the percentage of women studying and working in STEM is higher in middle-income countries compared to that of higher income countries (for example in Iraq the percentage of female researchers in science is 39.7) (UNESCO, 2018).

However, this progress has also often been described as slow and falling short of the 2030 Agenda and Sustainable Development Goal 4, "to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Gender gaps in the region are also likely to widen further due to unmet and unresolved concerns of women and girls, political and economic turmoil, conflict, occupations, and the Covid-19 pandemic (UNICEF, 2021).

Similarly, despite the recent documented progress in girls' access to education mentioned above, also in the field of STEM, they are still often excluded in many countries, especially when it comes to higher education. Or those who are enrolled are not receiving education that meets the quality and skill standards needed to enter the labour market, even at the secondary and tertiary levels. In MENA countries, women are also almost twice more likely to be illiterate than men. Although all MENA governments require that all children receive at least five years of schooling and all offer free education at least through high school, rapid population growth and lack of resources pose a challenge for them. In addition, gender sensitivity is an essential aspect to consider, as curricula and educational materials play a key role in shaping the knowledge and opinions of new generations, but in the MENA region they often tend to reinforce traditional roles that can deprive women of equal participation in society (Roudi-Fahimi and Moghadam, 2006).

The importance of education for girls in the MENA region

Education has been described as a key pathway for girls' empowerment in the MENA region: as their education levels increase, fertility, population growth, and infant and child mortality decline, and family health also improves. In addition, as more girls complete secondary education, more women are in the labour force and are able to earn a living, which improves child nutrition when women also have children. Education for girls has also a generational impact: children, especially daughters, of educated mothers are more likely to have higher levels of educational attainment and educated women will more likely be aware of their rights and politically active (Roudi-Fahimi and Moghadam, 2006).

Education system in Iraq: the structure and recent challenges

In Iraq, public education is provided for free, from primary school to higher education. The years of schooling comprise six years of mandatory primary education, which starts from the age of six years, (while in Kurdistan Region mandatory education last until 15 years old), followed by three years of intermediate school, then three years of secondary education, which can be general secondary of scientific and literary, secondary vocational industrial, agricultural, or commercial or teacher institutes. Students who finish high school and get the minimum qualifications for post-graduation study can enter universities or technical institutes, extending their studies for at least four more years. The students at teachers' institutes or secondary vocational institutes who manage to obtain high grades are also allowed to enter colleges and universities (IRFAD, 2021).

However, the country has allocated less than 6% of its national budget to the education sector, (placing Iraq at the bottom rank of Middle East countries) and years of prolonged conflict, services disruption, displacement, and under-investment in Iraq have destroyed what used to be the best education system in the region (UNICEF, 2021). Today, there are one millions internally displaced people in Iraq, and 3.2 million school-aged children are out of school and therefore more vulnerable to exploitation, abuse, child labour, recruitment by armed actors and early marriage. The conflict has destroyed educational infrastructure and has produced trauma for both children and teachers, with long-lasting psychological effects that negatively impact their learning processes and abilities of students, as well as the overall quality of education (UNICEF, 2021).

Moreover, the new crises that started in 2019 which included waves of public protests due to the deterioration of the economic situation and disrupting classes, the economic repercussions of Covid-19 lockdowns, and the severe drop in oil prices put even more pressure on governmental resources and further affected access to education. In the academic year 2019/2020 many teachers were no longer paid and children in areas affected by protests and COVID-19 measures are likely to have lost at least five months of in-school education (ACAPS, 2020).

Education is now being offered through a decentralisation of service delivery, however the education departments at governorate level are not always fully capable and experience challenges in implementing education policies, plans, managing human resources, supervising schools, and managing the infrastructure. In particular, one out of every two schools is damaged and needs rehabilitation. Those still functional are often overcrowded and use shifts to include as many children as possible, inevitably affecting the quality of teaching and the students' learning. (UNICEF, 2021)

In terms of literacy rates, 2020 data from the World Bank indicates that the literacy rate among youth was quite high and almost equal between sexes: female youth literacy rate was 92.10%, while the one of male youths 94.90%. However, according to UNICEF, 2020 data show discrepancies in youth literacy rates between urban areas (83%), and rural (68%), as well as between wealth quintiles (strata of society). In the poorest quintile, the rate is 53%, in the second quintile 73%, in the middle quintile 79%, in the fourth quintile 90%, while in the richest quintile 94%. Moreover, when it comes to IT education, only 9% of people that completed secondary education have basic ICT skills, while people that didn't complete this level of education have no ICT skills at all, and the gap between the poorest (1%) and richest (20%) is even wider (UNICEF, 2020).

Barriers to education in Iraq

Iraq is one of the youngest countries in the world with almost 60% percent of the population under 24 years old (11,736, 897 males and 11,217, 392 females) and the population is composed of several ethnic and religious minorities, including Christians, Kurds, Turkmens, Assyrians, and Yazidis. According to Minority Rights Group International, approximately 96 percent of the country is Muslim.

According to UNAMI and OHCHR there are several barriers that limit access to education in post-conflict Iraq. First of all, the children and young adults who lived in areas controlled or influenced by so-called Islamic State of Iraq and the Levant (ISIL) have an education gap due to years of missed education and often have challenges in obtaining the civil documentation for enrolling into formal education (at least one missing document per family). Moreover, children from these communities (or now young adults) are also disadvantaged by insufficient numbers of schools (which end up being overcrowded), or lack of school equipment and/or destroyed infrastructure, lack of resources and poverty, in both urban, rural, and camp environments (UNAMI and OHCHR, 2020).

Moreover, poverty continues to negatively affect equal access to education in the country: while only private schools impose fees, the families of children attending public schools still need to pay for some education and writing materials, along with transport if the school is far away and if this includes children with disabilities (Save the Children, 2016). Also, poor families might not have the money to pay for laptops, SIM cards, internet connection, or tablet/mobile devices to ensure their children continue following the curriculum from home during Covid-19 lockdowns. In 2018, less than a fourth of children in Iraq had a computer at home, half had access to the internet, and less than 10% of them had radios in their houses. Moreover, even when such technology is present men tend to have more access to it compared to women (ACAPS, 2020).

The conflict has also increased the vulnerability of families perceived affiliated to ISIL due to the wider restrictions that are currently imposed upon them. The situation is also particularly complex for all those young adults residing in camps that were previously living under ISIL controlled areas since they are now too old to attend mainstream schools and are left with no alternative options and will enter adulthood without any post-primary schooling (UNAMI and OHCHR, 2020).

In terms of impact, recent data shows that there are almost 3.2 million school-aged children out of school in the country. The situation is worse for girls, who are under-represented in both primary and secondary schools. These numbers are higher especially in Salah al-Din and Diyala, where more than 90% of school-age children are not in the education system. Also, almost half of all school-age displaced children (more than 350,000 children) are not in school (UNICEF, 2021).

Gender and education in Iraq

In Iraq women and girls today still continue to suffer from insufficient educational opportunities and healthcare, as well as limited access to the labour market, compounded by high levels of violence and inequality. Their condition in recent years has been particularly affected by prolonged armed conflict, persistent strong conservative culture (often misconceptions of traditions, as well as cultural and social norms) and economic sanctions that negatively affected women's role in the country, constraining women, and girls to traditional reproductive roles, limiting their access to employment and education (Vilardo and Bittar, 2018).

When it comes to girls' education in Iraq, according to recent data the country's female literacy rate in 2020 was 44.4%, the lowest in the MENA region (STATISTA, 2020). The country also was ranked in Group 5 of the "Gender Development Index" in 2019 (the lowest category of countries in terms of gender equality). Iraq also ranked 146 out of 162 countries for the Gender Inequality Index, while in terms of Human Development Index the country was in the medium human development category, ranking 123 out of 189 countries and territories (UNDP, 2020).

When it comes to accessing education for girls in Iraq the challenges are even greater: traditional gender roles and norms, low levels of family education, poverty, perceived protection concerns and trauma continue to affect girl's inclusive and equitable access to education in Iraq, particularly in areas formerly controlled by ISIL. In the country many women and girls' education is affected by traditional stereotypes and gender divisions which promote gender inequality. Girls are often denied access to education or removed early from school. In addition, perceptions of girls' safety further exacerbate the situation, often leading to additional discriminatory practices and harmful coping mechanisms. Lack of education for girls in Iraq results in low female literacy rates, lack of female participation in the formal employment sector, and increased instances of child, early and forced marriages, with those living in rural areas, affected by displacement or severe poverty are particularly vulnerable (UNAMI and OHCHR, 2021).

With respect to girls' access to education in Iraq, their enrolment has increased at all levels over the past 20 years and at a faster rate than boys' one, although they still outnumber boys and tend to drop out of school at a higher rate. Furthermore, more than 28 percent of women aged 12 or older are illiterate, more than double the rate for men. At the same time, more than 80% of women aged 15 or older do not participate in the formal labour force and are particularly vulnerable to poverty, as the unemployment rate for young women is also much higher than for young men. There are currently no specifics regarding sexual harassment in the country, but a recent survey by the Iraqi Women Journalists' Forum found that eight out of ten women surveyed in Iraq report having suffered some form of sexual harassment, and one in five women and teenage girls aged 15–49 has experienced physical domestic violence (Vilardo and Bittar, 2018).

Education in Shatt Al-Arab, Basra

Basra is a city located in the southeast of the country and is a socioeconomic hub as it holds a significant proportion of Iraq's oil reserves. The port of Umm Qasr is the only Iraqi shipping hub, and the economic development priorities of the governorate tend to focus mainly on oil and transportation (IAU, 2010). According to recent data, unemployment in Basra affects 20 to 25 percent of the people and almost 30 percent of youth, higher than the national rate (Faleh, 2021). Women are particularly affected by unemployment because of lack of education in general, and IT skills, and nationwide (in Basra the percentage is likely to be higher) only 12% of women participate in the labour market (IOM, 2019).

When it comes to education in Basra, several issues internal to the education system, but also external problems, continue to affect access to education as well as quality of the education system. Recent data indicates that there are more than 800 schools in Basra with deteriorating infrastructure, including water and sanitation facilities. Moreover, in recent years households' members tend to increasingly rely also on children for generating income due to increasing prices of essential goods and lack of jobs (Sletten and Campbell, 2018).

Access to education in the city is also more challenging for children with disabilities (CwD), as educational institutions, where they exist, are often inadequate for special needs (in terms of infrastructure and teacher training on the needs of CwD) or far-away. In addition, social norms and beliefs imply that education of CwD, especially girls, is not a priority due to the lack of jobs (ACAPS, 2020).

Moreover, similar to the national context, girls are generally more likely to drop out from school than boys, also in Basra, and especially to complete secondary or higher education. This is particularly the case in Shatt Al-Arab district, where conservative social norms, coupled with poverty and lack of jobs, often lead communities and families to keep girls out of education.

Shatt Al-Arab District in Basra is on the East bank of the Shatt Al-Arab waterway and has a population of around 80,000 people. Due to landmines in the area an estimated 350 square kilometres in Shatt Al-Arab are contaminated and most of the district is rural or deserted. This District struggles to maintain a basic level of development: infrastructure including schools, medical facilities, and sewage systems are in disrepair, unemployment is high, and illegal drug use is common (IOM, 2019). Like many other areas of Iraq, females in Shatt al-Arab have fewer social, economic, and educational opportunities than males. Early marriage, household responsibilities, a perceived lack of job opportunities and conservative gender norms limit girls' access to secondary school and eventual employment.

The importance of IT education for girls

Several authors have underlined that the importance of STEM education in the MENA region is still clearly under-studied (Kayan-Fadlelmula, Sellami, Abdelkader, & Umer, 2022). Additionally, a scarcity of research on the importance of STEM education for women in the Middle East and the factors that push them to enrol in such kind of education, leads to a gap in the literature not only regarding the importance of female role models in STEM, but also in their ethnic and cultural diversity (Dajani, Dhawan, & Awad, 2020).

However, even though contemporary literature tends to focus on the benefits of Information Technologies (IT) and computer sciences education particularly for women and girls in the Global North and specific studies on the subject have not yet been fully conducted for Arab countries, the common findings and conclusions may be universally applicable to Arab countries, considering the common gender gaps that distinguish all societies in the world. In particular, research conducted in many countries has underlined the critical role of STEM-related education for new generations as a pathway for increasing a country's global competitiveness and prosperity, as well as a driver of human capacity building (Kayan-Fadlelmula et al. 2022).

Nowadays, IT education has the power to potentially shape the future of countries, as countries lacking professionals with adequate IT knowledge are less likely to develop, and increasingly IT skills are fundamental for the youth to successfully enter the labour market. In developing countries, women are particularly affected by this "digital divide", as they generally tend to access less IT education opportunities than men. They also face discriminatory social and gender norms regarding ICT careers that are perceived as inappropriate for women. Women and girls also often lack access to IT devices, and when they do have access, they also lack the time to use them (Nor, Khalad, Alrafadi and Hussein, 2015).

In Arab countries, women and girls are the minority of web users. They are often not aware of the transformative power of IT education, they face gendered social and cultural norms preventing them

from pursuing IT education and careers, and the geographic location of ICT facilities often results in a gender gap in access (Nor et al., 2015).

Therefore, globally, the number of young women completing graduate studies in computer science remains lower than that of men, and women and girls are underrepresented in science and technology. Thus, IT is likely to exacerbate the gender gap, especially in the global South, including in the MENA region, if IT education is not fully inclusive, including for girls.

However, IT education could potentially represent a foundation for IT innovation in developing countries and a better quality of life potentially for billions of people (Nor et al. 2015). IT education is also considered as a key skill for student's general education, access to higher education and transition to the workforce (Randall and Zirkle, 2005). It is therefore critically important, especially for women, who in countries such as Iraq are less likely to enter the labour market and close the gender gap.

Equal access to IT education for women and girls also means addressing existing gender gaps present in the social fabric by all relevant stakeholders in a country, such as national governments, the private sector, donors, civil society, and educational actors (Nor et al., 2015).

The benefits of coding education

Similarly to the case of studies on the benefits of IT education for girls, the contemporary literature tends to lack specific studies on the effects of coding education for girls in the South, in particular Arab countries, since the field of study has emerged relatively recently. However, as in the case of IT education, several authors have pointed to the theoretical benefits of coding education for women and girls, which, although originally intended for Northern countries, could also be applied to Southern countries, including Iraq.

Recently, authors have underlined that if the benefit of STEM-related education would be equally shared between sexes, this could lead to a world in which women are active and valued members of society. Moreover, female role models and other successful women in the field of STEM (such as female science, maths, IT, Coding teachers) can become a great source of inspiration for girls and demonstrate clearly that also in those fields women can provide a great contribution, both in the Arab world as well as in any country, since most STEM role models continue to be pictured as male and Western (Dajani et al., 2020).

When it comes to the benefits of IT and Coding education for girls there are several benefits: a coding class allows students to enhance their creativity, critical thinking, problem solving, creative and algorithmic thinking while teaching concepts related to mathematics and informatics (Okal, Yildirim & Timur, 2020).

Moreover, recent studies show that coding education, particularly for children, contributes to improve problem-solving, logic, imagination, empathy (putting themselves in the user's shoes), excellent communication skills, multitasking abilities, aesthetic judgement, and design skills. Teaching coding also allows students to develop solid teamwork skills, as they are regularly requested to work with others, contrary to the stereotype of a "solitary" type of education. In the long run, coding also allows girls and women to bridge the IT and, more broadly, the gender gap in the society to which they belong, allowing them to develop unique skills to enter the workforce and access jobs seen as designed for men (Ambrozowicz, 2018).

Therefore, IT and Coding education represents an innovative and gender transformative learning pathway, particularly for Arab countries and a country such as Iraq, in light of the many gender-

related challenges that hinder the active participation of women and girls in society. Through IT and Coding education, girls experience innovative educational pedagogy that will allow them to acquire advanced, up to date and unique IT skills (understanding the use, functions and benefits of IT and Coding instruments and devices) while developing interpersonal skills, critical thinking and problem solving abilities, increasing their employability in the labour market, and helping to reshape social constructs that view computer science and coding as predominantly male domains.



Mercy Hands implementing the “Boosting the technology skills of girls in Basra, Iraq, through IT/coding classes” project in Basra, in partnership with Mercy Hands Europe and with the support of the Canadian Fund for Local Initiatives

Mercy Hands for Humanitarian Aid (MH) has been registered in Iraq as a Non-Governmental Organization (NGO) since 2004 and has become one of the biggest national NGOs, working in conflict torn and disaster affected areas to save lives, sustain human rights and restore a healthy community. MH serves people in need, regardless of their religion, gender, ethnicity, or political affiliation. In Iraq post-ISIS, MH has been moving away from emergency response and more towards recovery and development, including education, with a priority focus on the needs of women and girls.

In February 2021 MH launched the pilot project “After-School Coding Club for Girls” in Shatt Al Arab District, Basra, the first ever of its kind in Iraq. The club opened in April 2021, the project is ongoing, and it is self-funded by MH. The club is located inside the Headquarters of the Directorate of Education (DoE) in Shatt Al-Arab, as the Head of the Directorate allocated one of the vacant rooms for the project. As part of its exit strategy, the coding club will be handed over to the DoE in Shatt Al-Arab. The club is open to all girls of Shatt Al-Arab, the membership is free, and each student can attend a free one-month coding course. The number of students is limited to ten for each course, as the club has currently ten laptops available. MH has recruited two volunteer IT Instructors, and each one of them gives one session per week (four sessions per month) for a total of ten students. Every month a new group of ten girls students enrolls in the club and receives the same coding course. The course is based on a version of the Scratch Programme (purchased by Mercy Hands), a basic coding course in Arabic developed by Fahd Albinali, an engineer, and former researcher at MIT, and consists of 31 video lectures and three downloadable resources. Students are involved in a total of eight one-hour sessions (two sessions per week). During the sessions, the IT Instructor first reviews with the students their homework, gives them a new coding lecture, an in-class assignment, and works with them to complete their assignments. Finally the teacher gives the students a new homework. MH is also applying different teaching methodologies to ensure the effectiveness of the learning activities. MH provides the club with visualization and technology such as internet and a digital network system. The IT Instructors have all IT lessons stored in their laptops, every lesson is projected from their laptops to a large LCD monitor hung on the wall facing the students, and every student is provided with a laptop. The teachers also apply cooperative learning (students are given in-class assignments and are asked to work on them in groups), and differentiation (the IT Instructor assesses the students' IT knowledge and skills in the beginning of the course and accordingly designs individualized learning plans for them). Moreover, students with relatively high levels of IT knowledge and skills are assigned as “Teaching Assistants,” teaching the other students while learning more complex skills from the IT Instructor. As of February 2022, the total number of beneficiaries was 100 girls (ten girls per month), while indirect beneficiaries included all secondary school level girls in Shatt Al-Arab District, as well as the IT teachers of these schools, who have been offered "IT Capacity Building" Sessions. The teachers were trained on new IT and Coding teaching techniques and methodologies, as well as coached on how to tackle different challenges related to the educational process, such as limited resources.

Building on the experience and success of the “After-School Coding Club for Girls” pilot project, MH has then implemented the “Boosting the technology skills of girls in Basra, Iraq, through IT/coding classes” project in partnership with Mercy Hands Europe, and the Canadian Fund for Local Initiatives, from 10 October 2021 to 28 February 2022. This unique project, never implemented before in Iraq, has addressed the lack of IT skills among girls and teachers in Shatt al-Arab, Basra. Schools in the area often have IT classes as part of the curriculum, however the courses are rarely implemented since schools lack computers and trained teachers.

The project's goal was to empower girls by enhancing their IT/coding skills, and train teachers on IT/coding. MH has provided IT/coding classes for a total of 173 girls (ages 12 - 13) in public schools in Shatt al-Arab and trained 20 local female teachers on IT/coding. The classes for students have been held four days per week, for five months (after the one month of start-up and launch of the project). A total of five cycles of classes (1.5 hours per class) have been held (one month each), and within each cycle two groups of students (each group included 15 students) attended two days per week. The classes have been taught in Arabic by trainers. The classes targeted students in 7th grade in ten schools, since girls of this age are at high risk of dropping out before upper secondary school. The classes used the Scratch coding program, which is specifically designed for young learners, as well as

a more advanced second level program, while the curricula have been developed by an expert. The modules covered basic computer skills, concepts of programming, creation of simple games, but also teamwork, creative thinking, and analytical thinking. Twenty local female teachers, two from each school, have also been trained on IT/coding, and how to implement this class in their schools. The training took place two days each month, for five months, and each session was 2 hours long.

The long-term results achieved through the project included that 173 girls in Shatt al-Arab developed IT/coding skills (the initial target was to target 150 girls, however MH managed to reach more girls), which will improve their capacity to succeed in education and future employment. The classes also allowed girls to understand and develop their own potential, as well as showed to the local community that girls can develop practical skills, also linked to the IT field, that can contribute to income. Moreover, all the twenty teachers targeted by the project have successfully been able to deliver the IT/coding classes in their schools. It is also hoped that the students will continue to pursue other opportunities to further develop and apply their IT/coding skills, including for future employment. In addition, teachers trained through the project have been encouraged to apply their new skills by teaching IT/coding courses in their own schools. Moreover, the laptops purchased for students and teachers during the project will also be handed over to the schools at the end of the project.

IT and Coding classes for girls in Basra: the impact of MH and MHEurope project and our findings (survey)

Methodology

Between February and March 2022 Mercy Hands team in Basra has conducted a field research, through a Kobo questionnaire administered to the girls, teachers and schools' headmasters of the schools "Fatima Al Kubra School", "Al Kibasi School", "Zam Lam School", "Um al Qura School", "Shatt al Arab School", "Al Shaheed Hassan Jasim School", "Al Baleqa School", "Al Karaem school", "Al Fayhna School", "Al Quranful School" of Basra, Shatt Al-Arab District, targeted during the "Boosting the technology skills of girls in Basra, Iraq, through IT/coding classes" project, in order to assess the impact of IT/Coding education on four main dimensions: the use of computer/IT by girls, girls' future higher education plans, girls' household decisions and daily life choices, girls' future employability and careers in ICT, and the related gender biases in each of them. Therefore, we also focused on assessing whether changes in knowledge, thoughts and attitudes, described in the literature as positive outcomes of IT and Coding education for girls had occurred, and to which extent.

The survey for girls consisted of 38 questions, including two open-ended questions and 36 closed-ended questions (13 yes/no questions and 23 multiple choice questions). The survey for teachers consisted of 32 questions, including 31 closed-ended questions (13 yes/no and 18 multiple choice questions) and one open-ended question. The survey for the schools' headmasters consisted of 28 questions, including 27 closed-ended questions (12 yes/no and 15 multiple choice questions) and one open-ended question.



Findings

1. IT and Coding education: improving girls' lives? The survey for girls

Through the survey administered to the girls we assessed that from a total of 136 girls' respondents, **132 girls have attended 8 IT and coding classes** (97.6%), 3 girls have attended 4 classes (2.2%) and 1 girl has attended 7 classes (0.7%). The majority of the girls (70 girls - 51.5%) knew how to use a computer before taking IT & Coding classes, while 66 of them (48.5%) did not know.

Regarding the use of computers by girls, half of the total respondents indicated they already used one, the other half that they never did. When asked why they already knew how to use a computer before attending IT classes, out of 69 respondents, 38 girls (28%) stated they learnt how to use a computer because they had one at home; 18 girls (13.2%) were taught by family or friends on how to use a computer and 13 girls (9.6%) stated they learnt how to use a computer during previous IT classes they attended. When asked why they did not know how to use a computer before attending IT classes, out of 65 respondents, 43 girls (32%) stated that it was because they have no computer at home. 17 girls (12.5%) stated the reason why they had never taken IT classes, before the course provided by Mercy Hands. Three girls (2.2%) stated that the reason was that they cannot access the computer at home, despite having one; 2 girls (1.5%) stated that neither their family nor their friends have a computer, so they did not know how to use one before the course.

We also assessed that the majority of girls did not know what Coding was before attending the project's course: out of 136 respondents, 91 girls (67%) did not know what coding was, before attending the course, while 45 girls (33%) knew what it was.

Moreover, the girls indicated to have a high interest in IT related subjects even before starting the IT and Coding classes: out of 136 girls, 134 (99%) wanted to learn more about IT and coding before attending the course. Only 2 (1%) did not want to learn more about coding. When asked why they wanted to learn more about IT, before taking the course, 56 girls out of 134 respondents (41%) stated that they want to study IT and technology at university. 53 girls (38%) wanted to learn more about IT because they have always been interested in the subject. 19 girls (13%) wanted to learn more on the subject, because they want to have a job in the technology field. When asked why they did not want to learn more about IT and Coding, before taking the course, 2 participants out of 136 (1%) gave the reason to the fact that they have never used a computer before.

All the respondents' girls (135) also indicated that the classes taught them how to use a computer and do coding. In terms of what they learnt through the classes, 85 girls (62%) said that they learnt the basic functions of a computer, 41 girls (30%) = learnt how to use IT functions and coding programs, while 9 girls (6%) learnt how to solve problems with their computers.

The majority of respondents, 116 (85%) out of 136, also indicated that what they learnt during the classes, will help them to use a computer in the future. Twenty girls (14%) were not sure if what they learned will help them in the future. When asked about the reasons, out of the 116 girls, 62 girls (45%) said they learned the main functions of a computer that they will always use, 31 girls (22%) learned some very important things about coding, 22 girls (16%) thought that the many programs they learned during the course will be useful in the future. Out of the 20 girls who were not sure if what they learned during the course, will help them in the future, 15 girls (11%) said they didn't have or couldn't access a computer to practice, two girls (1.5%) were not sure if their community would allow them to use a computer in the future, two girls (1.5%) were not sure if their family would allow them to use a computer in the future, one girl (0.5%) was not sure if girls should continue to study IT and coding.

Regarding the impact of IT and Coding education on the future education of girls out of 136 girls, 134 (98%) indicated that what they learned during the course will help them study in the future. Only two girls (1.5%) do not think that what they learned will help them study in the future.

In terms of what the girls learned in IT/Coding that will help them studying in the future, out of 132 respondents, 33 girls (24%) indicated that they **learnt basic computer functions** that will help them in their future studies, 33 girls (24%) said it will help them because they **learned how to create a computer program**, 18 girls (13%) said the course **made them feel able to learn something they did not think possible at first**, 15 girls (11%) indicated that the **course improved their ability to solve problems**, ten girls (7%) thought **the course provided them with basic knowledge of coding**, seven girls (5%) said **the course helped them believe in their own abilities**, six girls (4%) said the course **taught them how to think outside of the box and find solutions to problems**, 6 girls (4%) said the course taught them how to best work with other girls, three girls (2%) thought the course taught them how to come up with ideas that are pleasing to their eye, one girl (0.7%) thought the course helped her better organise the things she had to do, and this will help her study in the future.

Regarding what the girls wanted to study after secondary school, the majority of respondents 125 (91%) out of 136, wanted to continue studying after secondary education. Moreover **72 girls (52%) would like to go to university one day**, 32 girls (23%) **would like to go to high school**, 14 girls (10%) **would like to go to university and study IT and technology**, and 7 girls (5%) **would like to go to high school and study IT, technology and/or coding.**

In terms of measuring the impact of IT and Coding education on girls' daily life decisions, out of 136 respondents, **122 (89%) indicated that what they learned will help them take better decisions in their lives**, while 14 girls (10%) didn't think that what they learned will help them take better decisions in their lives. When asked why what they learned will help them make better decisions in their lives, 63 out of 121 respondents (46%) indicated that they **learned how to use computers, programs, and internet**, 15 girls (11%) said they **learned to believe in their own skills and abilities**, nine girls (6%) said they **learned to solve problems on their own**, nine girls (6%) **felt more confident in asking for things from their families**, seven girls (5%) **learned how to use computer programs that will help them manage money**, four girls (3%) learned how to use computer programs that will help them organise their lives. Four girls (3%) say the course helped them to know what they want for their future. Three girls (2%) say they learned how to be creative and solve problems. 3 girls (2%) say they learned how to solve problems with other people. 2 girls (1.5%) say they learned to be more organised. Two girls (1.5%) say they learned to understand others better.

Also 128 (94%) out of 136 girls respondents **indicated that what they learned will help their families**, while 8 girls (6%) do not think so, in the following ways: 87 girls out of 128 respondents (64%) said **that they could teach their family how to use a computer**, 22 girls (16%) said **they will be able to pursue higher education, get a good job and help their families**, ten girls (7%) said they will help their families organise their decisions better, nine girls (6%) said they have learned to talk better with their family members. However, **when asked why they do not think what they learned will help their families**, now or someday, 5 out of 8 respondents (3%) **said that their families do not have a computer**.

Furthermore, 126 out of 136 girls (93%) indicated that **what they have learned will help their community, now or someday**, in the following ways: 54 girls out of 124 respondents (40%) think they **could teach their community members to use a computer**, 31 girls (22%) said they **learned to talk to other people better**, 16 girls (11%) thought **they can convince other people that computers and coding are important for girls**, 13 girls (9%) think they can **convince other girls to study computer science and coding because it can have a significant impact on their future**, 10 girls (7%) think what they learned will help their community to better organise decision making. Only 10 girls (7%) do not think that what they learned will benefit their community. Out of 10 girls who do not think that what they learned will help their community, five (3%) think this is because their community members do not have computers. Two girls (1.5%) would like to help their communities, but they do not know if they can participate in decisions. Two girls (1.5%) say that in their community, girls have to get married. One girl says that in her community, girls do not use computers.

The majority of girls respondents, out of 136 girls, 134 (98%), indicated that they wanted to find a job after their studies in the following fields: out of 133 respondents, 49 (36%) would like to **find a job where they can be creative**, 38 girls (27%) would like to **find a job where they can use a computer**, 13 girls (9%) would like to **find a job where they can create computer programs**, ten girls (7%) would like to **find a job where they can teach computer use**. Only 2 girls (1.5%) would not like to find a job after their studies. Moreover, out of 135 respondents, 132 (97%) girls indicated that **girls are capable of having a job where they use computers and technology because**: 95(62%) said **that anyone can do a job using computers and technology if they have the right skills**, 25 girls (18%) indicated that **girls and boys can use computers and technology in the same way**, 12 girls (8%) **said that girls are capable of having a job involving computers**, because they learned to use a computer, ten girls (7%) thought that it is important that more girls work in computers and technology because only men are allowed to do so.

2. IT and Coding education: improving girls' lives? The survey for teachers

Out of 15 teachers, 10 teachers (66%) attended 10 training sessions. 3 teachers (20%) attended 1 training session. One teacher (7%) attended 4 training sessions and one teacher (7%) attended 8 training sessions. Out of 15 teachers, **13 teachers (87%) were already teaching IT/computer sciences before the course**, while 2 teachers (13%) were not.

Out of 13 teachers who were already teaching IT/Computer sciences before the course, 6 teachers (40%) had been teaching it for more than 10 years, two teachers (13%) had been teaching it for two years, two teachers (13%) had been teaching it for 3 years, one teacher (7%) had been teaching IT/Computer sciences for 4 years, one teacher (7%) had been teaching it for one year, and another teacher (7%) had been teaching it for six years. Out of 15 teachers, 9 teachers (60%) were not teaching Coding before the course and 6 (40%) were teaching it. Out of 6 teachers, four teachers (26%) had been teaching it for more than 10 years. One teacher (6%) had been teaching it for 4 years and another one (6%) had been teaching it for 10 years. Out of 9 teachers, who had never been teaching Coding, 8 teachers (53%) did not have coding classes/courses in their schools, while 1 teacher (7%) did not know how to code a computer before the course. Out of 15 teachers, 10 (67%) wanted to teach IT and Coding before the project because they were already teaching IT. 4 teachers (26%) wanted to teach IT because they studied computer science and technology in college. One teacher (7%) had always been interested in computers.

All 15 teachers think the trainings helped them improve their computer and coding skills: out of 15 teachers, nine (60%) learned the basic functions of a computer and coding, five teachers (33%) learned how to use IT functions and programs, one teacher (7%) learned advanced programs and coding methods. Moreover, thirteen teachers (86%) think that what they have learned will help them improve their IT/Coding teaching in the future, and in particular out of 13 teachers, 9 (60%) said they learned the main functions of a computer that they will continue to use and teach girls students how to use, four teachers (26%) think they learned how to use many programs on the computer that they will teach their girl students how to.

All 15 teachers also indicated that what the girls learned through the IT/Coding classes will help them in their future studies, and the following subjects have been particularly relevant for the girls: six teachers out of fifteen (46%) indicated that **the girls learned basic computer functions, and this will help them study in the future**, four teachers (27%) said **the girls learned how to create a computer program**, two teachers (13%) said that the girls learned to think outside the box and to find solutions to problems, one teacher (7%) indicated that the girls learned something they did not think was possible and another teacher (7%) said the girls learned the ability to solve problems.

All 15 teachers indicated that girls should continue studying after secondary education. Eight teachers out of fifteen (54%) said girls should go to university, four teachers (26%) said girls should go to high school/university and study IT, technology and/or coding, while three teachers (20%) think girls should go to high school.

All fifteen teachers think IT and Coding education helps girls make better decisions in their daily lives for the following reasons: Eight teachers out of fifteen (53%) think **girls who learn computers show their families that they can also do things men usually do**. Eight teachers (53%) think **girls who learn computers show their community that they can also do things men usually do**. Seven teachers (46%) think **girls learn to solve problems on their own**. Six teachers (40%) think that **girls learn how to use computers, programs and the Internet, and this will help them take better decisions in their own lives**. Six teachers (40%) think IT/Coding education helps girls know what they want for their

future. Six teachers (40%) think girls learn to use computer programs that help them manage their money. Six teachers (40%) think girls learn to better understand others. Four teachers (26%) think girls learn to believe in their own skills and abilities. Four teachers (26%) think girls become more confident when asking things to their families. Four teachers (26%) think girls learn to be better organised.

Three teachers (20%) think girls learn computer programs that will help them better organise their daily life. Three teachers (20%) think girls learn to be creative and to solve problems.

All fifteen teachers think what girls learned will help their families now or some day. Ten teachers out of 15 (66%) think girls will be able to continue higher education, get a good job and help their families.

Eight teachers (53%) think girls can teach their family to use a computer.

Six teachers (40%) think girls can show their families that girls/women can also do things that normally men do.

Six teachers (40%) think girls learn how to better express themselves.

Three teachers (20%) think girls can help their family better organise decisions.

Fourteen teachers indicated that what girls learned in IT and Coding will help their communities now or some day. Eleven teachers out of fourteen (73%) think girls can teach their communities to use a computer. Seven teachers (46%) think girls can convince other girls to study IT and Coding as it can have a significant impact on them.

Six teachers (40%) think girls can show their community that girls/women also can use computer and technology.

Five teachers (40%) think girls can help their communities better organise decisions. Five teachers (40%) think girls can convince other people that IT/Coding education is important for girls.

Four teachers (36%) think girls can show their community that girls/women can also do things men normally do.

Fourteen teachers think that girls who have studied IT and Coding will have better chances to find a job. Eight teachers out of fourteen (53%) think **girls can find a job where they can be creative.** Four teachers (26%) **think girls can find a job where they can use a computer.** Two teachers (13%) think girls can find a job where they teach how to use computers.

All fifteen teachers think girls are able to do jobs where they use computers and technology. Thirteen out of fifteen teachers (86%) think that anyone can do a job using computers and technology if they have the right skills.

One teacher (7%) thinks that both boys and girls can use computers and technology in the same way.

One teacher (7%) thinks it is important that more girls/women work in the field of computer science and technology, as there are often only men to do so.

3. IT and Coding education: improving girls' lives? The survey for schools' headmasters

Regarding the teaching of IT/computer science we analysed that out of nine respondents, **six school managers (67%) said that IT/computer science was already being taught in their schools**, while three (33%) said it was not. Out of 6 respondents, 4 (45%) said **IT/computer science has been taught for more than 10 years in their schools before the project**, one (11%) said it has been taught for 1 year,

and one (11%) said it has been taught for 7 years. Instead, three schools (33%) said that IT/computer science had not been taught in their schools because they did not have IT class.

Moreover, five school managers (55%) **indicated that they wanted to integrate computer science and coding into the school curriculum before the project**, while four (45%) didn't want to integrate it. Instead, 2 school managers (22%) **said that they did not want to integrate computer science and coding into the school curriculum because they never used a computer in the class before**, 1 school manager (11%) said that they did not know what IT and coding were, and one school manager (11%) said they had interests in other subjects.

Regarding the impact of the IT/Coding classes on the girls' computer skills, **seven managers (78%) indicated that the training helped the girls improve their computer science and coding skills**. Six managers (66%) said this is because the girls learned the basic functions of a computer and coding, while one manager (11%) indicated it was because the girls learned advanced programs and coding methods. Instead, two managers (22%) didn't believe the classes improved the girls' IT skills. Out of the 2 school managers who do not think that the training helped the girls improve their computers science and coding skills, 1 manager thinks this is because the girls did not understand how to use a computer, and one thinks this is because the girls learned about IT but not about coding.

All the school managers that responded to the interview agreed that what teachers learned in the training will help the girls improve instruction and IT/coding classes in the future: six managers (66%) think that the teachers learned the main functions of a computer that they will continue to use and teach the girls to use. Two managers (22%) think the teachers learned how to use many programs on the computer and that they will teach the girls to use them. One manager (11%) thinks the teachers learned very important things about coding that they will continue to teach the girls.

Furthermore, all the nine school managers agreed that what the girls learned in IT and coding will help them in their future studies: 8 managers think the girls learned basic computer functions, and this will help them study in the future. 5 managers think the girls have learned the ability to solve problems. Four managers indicated the girls learned the basics of coding, and this will help them study in the future, four managers thought the girls learned how to create a computer program, two managers said the girls learned to think outside the box and find solutions to problems, while one manager indicated that the girls learned to work better with other girls. **Also, all the school managers that responded to the survey said that girls should continue studying after secondary education:** five managers (56%) said girls should go to university one day, two managers (23%) indicated that girls should go to high school, while one manager (12%) thought girls should go to university and study IT and technology.

Furthermore, all nine school managers think IT and Coding education helps girls make better decisions in their life: six school managers out of nine (67%) thought that girls who learned computer skills showed to their families that they could do things that men usually do. Three school managers out of nine (33%) said IT/Coding education helped girls make better decisions in their lives because they learned how to use computers, programs and the Internet; three school managers out of nine (33%) said that IT/Coding education helped girls take better decisions because they learn to understand others better; one school manager out of nine (11%) said IT/Coding education helped girls make better decisions because they became more confident in asking for things from their families. Another school manager (11%) said IT/Coding education helped girls take better decisions because they learned to use programs that will help them organise their lives. One school manager (11%) thought that girls learned to believe in their own skills and abilities through IT/Coding education. One school manager (11%) indicated that IT/Coding education helped girls know what they want for their future. One school manager (11%) said girls learned to be more organised through IT/Coding education.

All nine school managers indicated that what the girls learned in IT and Coding will also help their families now or one day: three managers (33%) indicated that what girls learned in IT and Coding will help their families because they will teach their families to use a computer; three school managers (33%) said girls will be able to pursue higher education and get a better job to ultimately help their families; two school managers (22%) said girls will now help their family members organise decisions better, thanks to the the IT and Coding education they received. One school manager (11%) said girls have shown their families that girls/women can also do things men normally do.

All nine school managers think what girls learned in IT and Coding will help their communities now or one day: three managers (33%) said that girls can teach their community members how to use a computer; two managers (22%) indicated that girls can show their community that girls/women can also do things men normally do; two managers (22%) said that girls can help their community to better organise decisions; one manager (11%) indicated that girls will convince other girls to study IT and Coding because it is important to them; one manager (11%) said that girls will show their community that girls/women can also handle computers and technology.

All nine school managers think that girls who have studied IT and Coding will be more likely to get a job: Out of nine school managers, five managers (55%) said that girls will be likely to find a job where they can be creative, two managers (22%) thought that girls will be likely to find a job where they can use a computer. One manager (11%) indicated that girls will be likely to find a job where they can teach how to use a computer. One manager (11%) said that girls could now find a job where they can create computer programs.

All nine school managers think girls are suited to do work where they use computers and technology: Out of nine school managers, three managers (33%) indicated that anyone could do a job using computers and technology if they have the right skills; three school managers (33%) said that girls and boys can use computers and technology in the same way; two school managers (22%) indicated that girls are suited to do work where they use computers because everyone can learn how to use a computer; one manager (11%) thought that it is important for more girls/women to work in the computer and technology field, as it is often done by men.



Lessons learned and recommendations

- **Include IT and Coding education in education interventions targeting adolescent girls in schools in Iraq and the MENA region, especially in the rural or underserved areas where ICT skills tend to be missing among the youth:** this case study shows how IT and Coding education has a positive impact on the IT skills of adolescent girls, and also on various domains of girls' lives, in terms of changes of attitudes, perceptions and opportunities.
- **Advocate at local and national level in Iraq and the MENA region for the inclusion of IT and Coding education as part of school's curricula:** this case study shows that IT and Coding education has several benefits for the girls in terms of critical thinking, basic IT knowledge, and creativity.
- **Consider using IT and Coding classes (led by women) for fostering gender equality among communities:** the involvement of women and girls in IT, STEM and ICT related fields contributes in a pragmatic way to promote positive role models of women in fields often characterised by gender biases, with the potential of contributing to a generational change of the perception of women and girls' role in society.

- **International and national humanitarian and development actors should always tailor IT and Coding education activities and projects to local contexts and based on gender analysis:** in order to detect societal perceptions, practices and mechanisms which could potentially hinder girls' participation to the projects or the full attainment of the impact and goals. Moreover, based on the analyses conducted, recommended areas for future research and programming include: capitalising on opportunities offered by educational training to boost change in gender roles; gender-transformative design of school curricula; using education programmes to address the way in which unequal gender norms create undue burdens for women.



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