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Factors affecting ICT education among vulnerable minors in Malta: Findings of the *Star Kids* Research Project

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Abstract: This paper identifies and discusses needs and gaps among minors aged 5-17 years who, at the time of the study, resided in out-of-home care and/or made use of community-based welfare services. The discussion is informed by mixed-methods study research carried out in 2018 as part of the project 'Star Kids – Reaching Out: Improving the Life Chances of Vulnerable Children'. Star Kids' objectives included developing and delivering a nationally accredited ICT training course for vulnerable minors; in a context where digitization is often described as ubiquitous, yet its experience is complex and not universal. In this paper, data analysed include responses to a questionnaire administered to minors; and data from focus groups with minors, their parents/guardians, and professionals working with the cohort under study. The study found high ICT usage, albeit with gender-based and age-based differences. Gaming, streaming and downloading prevailed among boys and 5–11-year-olds; use of social media prevailed among girls. Most minors considered themselves as self-learnt ICT users; yet the study flagged the need for more support for minors with low socio-economic backgrounds. The study identified shortcomings in the infrastructure available. Recommendations include investment in state-of-the-art ICT infrastructure in residential homes and community centres; further research to assess impacts of COVID-19 on this study's findings; policy development that steers ICT education towards participatory and empowered involvement of parents /guardians; and that dwells on participants' existing ICT knowledge and skills.

Keywords: digital divide, ICT, minors in care, vulnerable children and youth.

Introduction

In 2018 the Faculty for Social Wellbeing within the University of Malta (UM) partnered with the Malta Communication Authority (MCA, Malta) to conduct the research project *Star Kids – Reaching Out: Improving the Life Chances of Vulnerable Children*. This project was co-funded by European Structural and Innovation Funds 2014-2020 and National Funds awarded to the Malta Communications Authority; which entrusted part execution to the Faculty for Social Wellbeing (FSW) of the University of Malta. The FSW's brief included developing and delivering a hands-on, nationally accredited ICT training course, based on validated needs of vulnerable minors aged 5-17 years to bridge gaps in the target population's knowledge and skills to enhance their future prospects, life skills and future sustainable employability.

Despite their upbringing outside 'conventional' family circumstances, these minors are not 'vulnerable' by default. In the context of this paper and for the purposes of the broader *Star Kids* project, engagement with the term 'vulnerable' is/was project specific – with concern about minors at risk of falling behind in digital skills due to limitations in access, support or knowledge (Helsper & Reisdorf, 2017; Livingstone & Helsper, 2007). These factors lead to disadvantage when it comes to improving future life prospects or reaping the benefits of accelerated uptake of digitization (Smeaton et al, 2017).

This paper's discussion is informed by data provided by minors living in out-of-home care or residential homes; or who, at the time of the study, made use of community-based welfare services of *LEAP!*, Malta. Based in various localities in Malta and Gozo, *LEAP!* centres support persons and families impacted by poverty and social exclusion (Foundation for Social Welfare Services [FSWS], n.d.a). The study will also draw on data provided by the parents/guardians of or professionals working with minors in care or benefitting from *LEAP!* services. This paper's discussion focuses on the study's findings that inform responses to the following research questions:

1. What ICT skill gaps and needs exist among minors aged 5-17 years, residing in out-of-home care and/or making use of community-based welfare services (*LEAP!*), at the time of the study?
2. To what extent and in what ways do such gaps and needs impact this cohort's engagement (actual and prospective) with ICT education?

Further to this introduction, this paper's discussion will review the context of the study, as well as a selection of perspectives, studies and policies that informed the study's engagement with digital access, digital engagement and related limitations and inequalities. The discussion will proceed with an explanation of the research design that yielded the findings discussed in this paper; the presentation and discussion of findings; conclusions, and recommendations for further research, policy development and practices.

Context

Unprecedentally, in the United States, the Pew Research Center (Auxier et al., 2020) found 80% of children aged 5 to 11 regularly use a tablet; 67% of children aged 9-11 and 59% of children aged 5-8 regularly use smart phones; 17% of children younger than 11 owned a smart phone; whilst 31% of parents/guardians stated that this started before the children were 2 years old. In Jiang's 2018 study, 45% of American teens reported they were nearly constantly online; while the Office of Communications of the United Kingdom (Ofcom, UK, 2019) reported that 87% UK households were online in 2019.

The increasingly widespread use of information technology has changed how we communicate, learn, socialise and entertain ourselves (The Digital Economy and Society Index [DESI], 2020). This has a huge impact on how young people live their lives, particularly as sound ICT skills could be the key to improved personal, social and scholastic, or career success (Aliyu & Umar, 2021; Picatoste et al., 2018). Prior to the pandemic, the Internet was mainly used for personal or work communications, online purchases and banking, entertainment, and research related to work or school (DESI, 2020); however, the COVID-19-related move to online schooling and working highlighted the risks of digital exclusion for the most vulnerable (McClain et al, 2021).

While the research informing this paper's discussion took place around 2 years prior to the COVID-19 pandemic, the latter, especially through the introduction of remote learning, amplified this trend and changed how digital media is consumed across all ages (Bao et al., 2020). By 2021 almost everyone had gone online as a result of the pandemic (McClain et al., 2021). For families not digitally savvy or with inadequate access to Internet or resources, this situation was sub-optimal (Manca & Meluzzi, 2020). Ofcom (2021) found that in 2020 almost all UK school-aged minors (5-15 years old) moved to online schooling; yet 2% could only access the Internet via smart phone, while a further 20% did

not have adequate access to a device for home schooling, which impacted their overall education including their ICT skills (Ofcom, 2021).

Minors' digital engagement: opportunities and risks

For minors being online carries both risks and rewards. It presents opportunities for learning, self-expression, consolidating friendships, strengthening skills and exploring interests (Organisation for Economic Co-operation and Development [OECD], 2021). However, it also opens them up to risks, including cyberbullying, inappropriate content, Internet scams, oversharing and cyber-predators (Kardefelt Winther et al., 2019). However, there are greater risks to not being online at all, or not enough to master the skills that will improve future prospects. In a digital age, the ability to effortlessly navigate the wealth of available information, create digital documents and forms, and interact competently while staying safe cannot be over-stressed (Livingstone et al., 2017). Digital exclusion follows the lines of social exclusion whereby socio-economic status, deprivation and geographic locality are factors that may lead to disinterest or lack of digital access and skills (Paus-Hasebrink, et al., 2019). Digital exclusion is particularly damaging as it leads to exclusion in areas essential to social success and wellbeing such as job search, fulfilment of employment-related criteria, uptake of knowledge and information, and commercial activities (Picatoste et al., 2018; Livingstone & Helsper, 2007).

With the Internet playing a central role in minors' lives (Burns & Gottschalk, 2019), having the requisite skills is vital. Although most disadvantaged minors do use the Internet, they may not be aware of how to optimise this to enhance their future prospects (Burns & Gottscalk, 2019). The notion of the 'digital native', i.e., that persons born post-1980 into the digital age, are a homogenous group who are all naturally ICT experts in a world abundant with digital opportunities (Akçayır et al., 2016); has been widely disputed (Evans & Robertson, 2020; Helsper & Smirnova, 2016; Helsper & Eynon, 2010). In reality, the differences are plentiful – besides non-users, there are also differences in the quality of use amongst children and young people who use the Internet (Livingstone & Helsper, 2007).

The possession of, and access to ICT and Internet skills are linked to diverse positive outcomes in educational experiences and performances and in the labour market (Gonzales, 2015). Alongside school resources, ICT is one of the main factors affecting academic performance; and as a result, success in later

life (Erdogdu & Erdogdu, 2015). Digital technologies are used in a variety of jobs and the resulting digital economy has changed the way people think and work, and more importantly, the skills they need for work (European Commission, 2017). In a world of increasing digital complexity, (not) having ICT skills that enable meaningful socio-economic participation can impact how well an individual can take advantage of opportunities and maximise the potential offerings of the digital world (Livingstone et al, 2017; Eynon & Geniets, 2016; Hargittai & Hinnant, 2008). Factors such as access, interest, experience, exposure, socio-economic status and family culture all affect ICT skills in minors (Hatlevik et al., 2018; Facer &Furlong, 2001). Mere provision and availability of ICT hardware to vulnerable minors does not translate to effective accessibility to ICT (Diogo et al., 2018). Successful accessibility is based on the personal possession of necessary digital skills, high levels of awareness, willingness and a motivation to engage in the digital world (United Nations e-Government Survey, 2012).

Disadvantaged children and young adults are being left further behind in the digital world, particularly where it comes to skills that can lead to real-world opportunities, such as content creation and information navigation (Helsper & Smirnova, 2016).

Yang et al, (2019) found that children from less advantaged socio-economic backgrounds experience disadvantage regarding the accessibility of ICT equipment and quality of use which mediate achievement in other areas. Moreover, the widespread idea that children are computer naturals might harm their interests, as this implication may lead teachers and educators to believe that these children possess skills which they do not in fact have (Evans & Robertson, 2020). Particularly for vulnerable minors, whose life outside of school might not contain adults who encourage or enhance their uptake of ICT skills, it could be down to teachers and schools to bridge the gaps and help these minors acquire the requisite abilities, as well as the safety know-how (Helsper & Eynon, 2010; Facer & Furlong, 2001). Masters et al. (2020) add that although, overall, the digital divide is diminishing; for disadvantaged families the gap is in fact widening, and the pandemic exacerbated this trend. The digital divide is predominantly due to a lack of financial, educational, social and cultural resources, which will have short as well as long-term repercussions (Masters et al., 2020; Livingstone & Helsper, 2007).

Policy responses

Entitlement to appropriate and accessible ICTs is enshrined in numerous EU policy documents and is a key area in the *EU's Digital Compass 2030* document (European Commission, 2021), with reference to ICT skills required in future workplaces, European digitalisation and the role of ICT in improving opportunities for young people (European Commission, 2021).

Malta, likewise, acknowledges the central role that digital literacy plays in contemporary society. Digital literacy is among the cross-curricular subjects recognised in the *National Curriculum Framework* [*NCF*] (Ministry of Education and Employment, 2012); whilst the *National Literacy Strategy for All in Malta and Gozo 2014-2019* (Ministry for Education and Employment, 2014) recommended the acquisition of digital literacy from an early age as an asset for active participation in social, cultural, commercial and educational activities. Similarly, *Digital Malta – National Digital Strategy 2014-2020* (Ministry for Competitiveness and Growth, 2014) advocated and targeted increased access for all, stimulation of local content, enhancement of digital literacy and social equality.

Notwithstanding these policies and increasing digitalisation and connectivity (Mifsud & Petrova, 2017), researchers have found evidence of a continuing digital divide in the Maltese islands, particularly among sections of the Maltese population that do not have access to the Internet or to devices that can connect to the Internet (Camilleri et al, 2015, Cruz-Jesus et al., 2016). Such disparities were among the motivations that informed the *Star Kids* project.

Methodology

Research design

The study informing this paper's discussion combined a mixed-methods, case study, needs-analysis approach that valued "…in-depth knowledge of an individual example…(as) more helpful than fleeting knowledge about a larger number of examples...(to) gain better understanding of the whole by focusing on a key part" (Gerring, 2007, p.1).

The research team collected data using a questionnaire administered to minors aged 5 to 17 years, and three (3) focus groups held with: (i) minors in care and/or making use of *LEAP!* services; (ii) parents/guardians of minors in care

and/or making use of *LEAP!* services; and (iii) professionals working with minors in care.

The questionnaire, designed using language and themes suited for minors under study, elicited demographic data; as well as information on level and quality of access to ICT and equipment, ICT use, skills, and learning experiences; support received and perceptions of safety.

The minors' focus group explored perceptions of their ICT skills, access to ICT, support and motivations, perceived risks, and suggestions for ICT courses. Focus groups with foster care givers/parents and professionals centred on accessibility, motivation, support, risks and recommendations.

The research team used quantitative bivariate analysis, the Chi Square test (p-value 0.05 level of significance) to search for statistically significant correlations (Gravetter & Wallnau, 2015; Schutt, 2012); as well as thematic analysis of qualitative data to tease out thematic categories (La Rossa, 2005) and inferential meanings (Miles & Huberman, 1994).

Throughout the project informing this paper's discussion, the research team provided all necessary and true information to participants, their guardians (when relevant) and gatekeepers. This was enhanced through user-sensitive recruitment letters, consent and assent forms which, together with all tools, were reviewed and approved by the University of Malta's Faculty for Social Wellbeing's Research Ethics Committee [FREC] and, thereafter, piloted and fine-tuned. The research team also pseudonymised data at source and made provisions for secure, encrypted data storage and management in line with good research practices (Schutt, 2012).

Population and Samples

At the time of the study, 618 minors of ages 5 to 17 years were 'in care' (i.e., living in residential / foster homes) or living with family but included in the population of interest (vulnerable minors) due to their status as beneficiaries of community-based welfare services.

Table I – Population and Samples

Variable		Population = 618		Sample Questionnaire *n* = 66		Margins of Error (90% confidence interval)		Sample Focus Group: Minors	Sample Focus Group: Parents / Guardians	Sample Focus Group: Professionals
		f	%	*f*	%	+/- %				
Overall		618	100	66	10.7	9.6		*f*	*f*	*f*
Sex	Boy	N/A	N/A	39	59.1	N/A				
	Girl	N/A	N/A	27	40.9	N/A				
	Alternative / Preferred not to say	N/A	N/A	0	0	N/A				
Age cohort	5-11	355	57.4	40	60.6	12.2		6	5	3
	12-14	129	20.9	13	19.7	17.7				
	15-17	134	21.7	13	19.7	18.0				
Background	Residential (in care)	102	16.5	40	60.6	N/A				
	Foster (in care)			0	0	N/A				
	Not living in residential home	516	83.5	26	39.4	11.7		Total sample, qualitative component = 14 participants		

A total of 66 minors residing in minors' homes or benefitting from community services participated in the quantitative data collection (out of 160 invited to adhere to access provisions available to the research team). Thus, the quantitative sample featured an overall margin of error of +/- 9.6% at 90% confidence interval. Despite efforts to obtain more questionnaire responses from the different cohorts of vulnerable minors under study discussed earlier in this paper, restricted access to minors in care, particularly in foster care; and low response rates in general inhibited lower margins of error. Margins of error were particularly high for the cohorts of ages 12-14 years (+/- 17.7%) and 15-17 years (+/- 18.0%) (see Table I, where N/A indicates that population data could not be made available to the research team by FSWS).

Participants in the qualitative component of the study comprised a total of 14 persons: 6 minors, 5 parents/guardians and 3 professionals. The size of the three separate focus groups allowed in-depth discussions that yielded rich data such as personal opinions and detailed examples of daily experiences.

Consequently, quantitative findings – particularly those concerning cohorts of ages 12-15 and/or 15-17 - will be presented and discussed with constant reference to limitations of representativeness; and, when possible, with references to qualitative data that substantiates or elaborates the quantitative findings.

Findings

ICT Usage

Among participating minors, 78.8% of questionnaire respondents (n = 52) stated they used digital devices frequently (5-7 days per week), while only 1.5% (n = 1) stated did not use any sort of digital device at all (Table II).

Table II: Frequency of use of ICT and Residence

Residence	Not living in residential home	Residential home	Total
Does not use	0	1	1
1-2 days	5	2	7
3-5 days	1	5	6
5-7 days	20	32	52
Total	26	40	66

X^2 (3, N = 66) = 4.976, p = .174

Table III: Frequency of use of ICT and *LEAP!* beneficiary status

LEAP! Beneficiary Status		Yes	No	Total
ICT - Frequency of use	Does not use	0	1	1
	1-2 days	5	2	7
	3-5 days	1	5	6
	5-7 days	16	35	51
	Total	22	43	65

X^2 (3, N = 65) = 5.858, p = .119

When testing for significant differences between frequency of use of ICT and minors' backgrounds, the research team found no significant difference (i.e., p-values higher than 0.05 level of significance) between frequency of use and place of residence (not/residential home) (p-value 0.174, Table II); or between frequency of use and *LEAP!* beneficiary status (yes/no) (p-value 0.119, Table III). Gender analysis also revealed no statistically significant difference between frequency of use and being a boy or a girl (p-value 0.151).

Further scrutiny of type of ICT use revealed gaming (27.8%) and streaming (25.3%) prevailed, followed by use of social media (19%). School and educational activities accounted for 15.8% of ICT usage, while use of software (e.g., Microsoft Office) took up 8.2%, and other usage amounted to 3.6% (Table IV, where 158 is higher than the total number of respondents because of the multiple response question where the same participant could opt for more than one of the given responses).

Bearing in mind limitations of sample representation and related mitigators, quantitative findings suggest a gap between use of ICT comprising the more formal use of office tools and use of ICT associated with less formal content and platforms (games, social media, streaming and downloading). The relative comparability of use of ICT for social media (19.0%) and for school/education purposes (15.8%) suggests a balance between use of ICT for formal educational purpose and use of ICT for less formal or entertainment purposes.

Table IV: Types of use of ICT

	f	%
Games	44	27.8%
Social Media	30	19.0%
Streaming / downloading music, films etc…	40	25.3%
School / education	25	15.8%
Software such as Microsoft Word, Excel, PowerPoint etc.	13	8.2%
Other	6	3.8%
Total	158	100.0%

Further analysis revealed significant differences between uses of ICT and the sex (p-value < 0.001, Table V) and age cohorts of participants (p-value 0.005,

Table VI, where 158 is higher than the total number of respondents because of the multiple response question, hence the same participant could opt for more than one of the given responses).

In the context of the limitations of sample representation and related mitigators, analysis of quantitative data revealed gaming, streaming and downloading prevailed among boys (Table V) and among the youngest cohort (i.e., of ages 5-11 years, Table VI). Use of social media prevailed among girls (Table V, where 158 is higher than the total number of respondents because of the multiple response question, hence the same participant could opt for more than one of the given responses).

Table V: Sex and Types of use of ICT

	Sex	Boy	Girl	Total
ICT uses	games	34	10	44
	social media	12	18	30
	stream, download	25	15	40
	school, education	12	13	25
	office tools	2	11	13
	other	4	2	6
Total		89	69	158

X^2 (5, N = 158) = 21.542, p = <.001

Table VI: Age cohort and Types of use of ICT

		5-11	12-14	15-17	Total
ICT uses	games	32	5	7	44
	social media	7	11	12	30
	stream, download	22	9	9	40
	school, education	11	8	6	25
	office tools	4	7	2	13
	other	4	1	1	6
Total		80	41	37	158

X^2 (10, N = 158) = 24.988, p = .005

Further analysis revealed no significant differences in the uses of ICT when comparing responses of minors living in residential care and minors not living in a residential home (p-value 0.612); those benefitting from *LEAP!* services and those who are not (p-value 0.985); main sources / reference points for learning

ICT (self-learnt, school, family, friends; p-value 0.456); aspect of ICT that participating minors manifested most interest to learn (none, office tools, streaming and downloading, social media, surfing the Internet; p-value 0.757); and motivation/reasoning for the latter (to enhance communication, creativity, future prospects, other reason/s; p-value 0.636).

Knowledge and skills

The majority of minors (58.5%, 39 participants) answering the questionnaire specified they learnt what they know about ICT on their own (self-learnt); 24.6% (15 participants) stated that they learnt from family; 12.3% (9 participants) stated they gained their knowledge from school; while 2 participants stated they learnt from friends (Table VII).

Table VII: Age cohort and ICT Learning

Age cohort		5-11	11-14	15-17	Total
	Alone	20	10	9	39
	At school	6	1	2	9
	From family	12	2	1	15
	From friends	1	0	1	2
Total		39	13	13	65

X^2 (6, N = 65) = 5.744, p = .453

The family transpired to be a popular source of ICT learning, particularly among the youngest, 5-11-year-old cohort (Table VII). Bearing in mind limitations of sample representation and related mitigators (discussed in Section 5.5) the research team analysed qualitative data, which corroborated:

> *Most of the time, he asks us for help relating to using the tablet* (Foster parent 1).

However, the research team found no statistical significance between source of ICT learning and the sex (p-value 0.530) and age cohort of participants (Table VII, p-value 0.453); place of residence (own family/residential home, p-value 0.090); and status as *LEAP!* beneficiary (yes/no, p-value 0.678).

Minors stating they learnt what they knew about ICT (at the time of the study) alone (self-learnt) prevailed in a statistically significant manner (p-value 0.028, Table VIII) among those saying they had no problem with ICT and among those complaining about slow equipment / Internet connection (Table VIII).

Table VIII: ICT Learning and ICT Main Problem

	Learnt ICT	Alone	At school	From family	From friends	Total
ICT - Main Problem	None	26	3	4	1	34
	No Internet connection	1	0	1	1	3
	Does not know how to read	0	0	1	0	1
	Slow equipment or connection	10	5	6	0	21
	Other	2	1	3	0	6
Total		39	9	15	2	65

X^2 (12, N = 65) = 22.989, p = .028

Diversity of skill across the age cohorts, linked to the minors' degree of access to ICT skills and equipment, also emerged (yet in ways different from those discussed till now). Related data flagged inequalities between minors of the same age cohorts and/or living in the same residential home: professionals associated minors with more/earlier access with being better versed and skilled:

> *... the possession of skills varies according to the person and his cognitive ability. However, this also varies according to the children's background…we witness this if the child had never been exposed to computers and tablets... If a child enters a residential home at the age of eight or seven, he would not possess this concept as a child who already uses a tablet confidently at the age of three… children who move into a residential home have left a place that was not beneficial for them, and many are deprived of things which are obvious [normal] for others to have. Just as there are cases in which one can find neglect related to health, there are others who did not have computer equipment at home before moving into the residential home… or even educational items. Unfortunately, some children would not have ever been to school before, let alone having such equipment at home... Even due to the children's baggage, one must work with them individually…* (Head of Catholic Church residential home).

Nonetheless, analysis of minors' responses to related questionnaire questions – namely sources of help available and problems and issues encountered with

using ICT - revealed ambivalences with the above findings. More specifically, the residence of participating minors did not significantly impact minors' perceptions on help required (p-value 0.111, Table IX) and main problem / issue encountered concerning use ICT (p-value, 0.460). Notably, 32.3% of participating minors (21 respondents out of the 65 participants who answered this question) stated they do not need help with using ICT – the majority of these (15 participants) hailed from a residential home (Table IX).

Table IX: Residence and Help with ICT

	Residence	Not living in residential home	Residential home	Total
ICT - Help from:	Does not need help	6	15	21
	Needs help but no one helps	1	0	1
	Friends	3	7	10
	Family	11	6	17
	School	0	2	2
	Online forum	2	1	3
	Other	3	8	11
	Total	26	39	65

X^2 (6, N = 65) = 10.348, p = .111

Bearing in mind limitations of sample representation and related mitigators, the research team scrutinised related qualitative data. Qualitative analysis that validated knowledge and skills of participating minors included data provided by parents of minors in foster care and/or benefitting from community welfare service. Parents/guardians described their children as 'teachers' and flagged their own limitations in ICT knowledge and skills, and consequent limitations to supporting their children with ICT education:

> *Nowadays, even if you give a mobile phone to my daughter, she is only five years old, she is able to enter the phone's settings while I do not know how* (Foster parent 2).

> *There's not much we can do. We cannot provide much help from our end…because our time was different* (Biological parent 2).

Notwithstanding, gender and age analyses revealed significant differences between perceptions of help needed and help accessed. More boys than girls

stated they do not need help; whilst boys prevailed among those declaring reference points outside of friends, family, school and online fora (p-value 0.037, Table X).

Table X: Sex and Help with ICT

	Sex	Boy	Girl	Total
ICT - Help from:	Does not need help	13	8	21
	Needs help but no one helps	0	1	1
	Friends	4	6	10
	Family	10	7	17
	School	2	0	2
	Online forum	0	3	3
	Other	10	1	11
	Total	39	26	65

X^2 (6, N = 65) = 13.420, p = .037

Notwithstanding limitations of sample representation and related mitigators, the following findings of quantitative data analysis are noteworthy: the youngest cohorts, of ages 5-11 years, prevailed among those who stated they did not need help and among those who stated they get help from family; whilst participants of ages 12-14 and 15-17 years stating they received help from friends, family, school, online fora comprised a statistically significant minority (p-value 0.021, Table XI).

Table XI: Age and Help with ICT

	Age cohort	5-11	12-14	15-17	Total
ICT - Help from:	Does not need help	12	6	3	21
	Needs help but no one helps	1	0	0	1
	Friends	4	3	3	10
	Family	14	0	3	17
	School	2	0	0	2
	Online forum	0	3	0	3
	Other	6	1	4	11
	Total	39	13	13	65

X^2 (12, N = 65) = 23.854, p = .021

Access and infrastructure

A majority of participating minors stated they have no problem when using ICT (53.0%, 35 participants, Table XII). Despite the lack of significant difference between problems and issues encountered when using ICT and age cohort (p-value = 0.518, Table XII), sex (p-value 0.880) and place of residence (with family / residential home, p-value 0.394), complaints on slow Internet speeds or devices (31.8%, 21 participants, Table XII) are remarkable for the purposes of needs analysis targeted in this paper's discussion; more so given limitations of sample representation and related mitigators (discussed in Section 5.5).

Table XII: Age and Main problem with ICT

	Age cohort	5-11	12-14	15-17	Total
ICT - Main Problem	None	17	10	8	35
	No Internet connection	3	0	0	3
	Does not know how to read	1	0	0	1
	Slow equipment or connection	14	3	4	21
	Other	5	0	1	6
Total		40	13	13	66

X^2 (8, N = 66) = 7.178, p = .518

Qualitative data corroborate:

> *For instance, my son could not connect the tablet with our home Internet, and I informed them. However, they did nothing about it, so he needs to use the computer for certain homework tasks, and he does not manage to find them* (Biological parent 1).

Professionals participating in the focus group also expressed concern about limited access to ICT facilities and tools of minors in care. Professionals perceived minors in residential care as more vulnerable in this regard, mainly due the children's backgrounds and residential homes' financial constraints. Professionals also underlined their challenges in managing minors' access to ICT facilities and tools whilst supervising and quality assuring minors' encounters with potentially problematic family members and safe online use.

The latter might clash with minors' need to be free to use the Internet for leisure or learning. Data below elaborate:

> *We make sure that the young ones use a desktop and not a laptop to avoid using it in their bedroom due to possible abuse by adults on-line. Therefore, we ensure that we do not have too much equipment around. … we try to limit WIFI to the living room rather than in bedrooms. This has its own advantages and disadvantages. On the one hand, this is advantageous in cases in which the advisory board suggest that it is not advisable for the child to communicate with the mother with no supervision … On the other hand, this could act as a disadvantage as we try to leave the children's room as their hub, where they can feel comfortable, where they can bring out their identity, as with every other bedroom* (Head of Catholic Church residential home).

Learning interests and aptitudes

When asked about their desire to expand their ICT knowledge, a third of minors (27 respondents, 32.9%) expressed no particular interest in learning about new programmes or applications. Of those who responded positively, use of office tools prevailed (11 participants) (Table XIII). No significant differences emerged between area of learning interest and sex (p-value 0.207), age cohort (p-value 0.250, Table X); residence (not/living in residential home, p-value 0.585); and status as *LEAP!* beneficiary (yes/no, p-value 0.285).

Table XIII: Age cohort and Wants to learn in ICT

	Age cohort	5-11	12-14	15-17	Total
ICT - Wants to learn	Nothing	12	8	7	27
	Office	6	3	2	11
	Streaming & downloading	7	0	1	8
	Social media	6	2	1	9
	Surfing the Internet	3	0	2	5
	Other	6	0	0	6
Total		40	13	13	66

X^2 (10, N = 66) = 12.541, p = .250

Only 50% of questionnaire respondents elaborated the reason why they are interested to learn more about the chosen ICT area. Being able to enhance

communication and other reasons (e.g., leisure opportunities) prevailed among the motivations expressed by the minors who answered this question (Table XIV).

Table XIV: Age cohort and Motivation for ICT learning

	Age cohort	5-11	12-14	15-17	Total
ICT - Wants to learn - Reason	Communication	10	1	0	11
	Creativity	5	2	0	7
	Employment / future aspirations	1	1	2	4
	Other reason/s	8	1	2	11
Total		24	5	4	33

X^2 (6, N = 33) = 10.626, p = .101

The research team delved in the analysis of related data retrieved from the focus group with professionals. Findings illuminate considerations to be made when targeting the minors under study; particularly in the light of the evidence of (dis)interest just presented. The qualitative data below flag that aptitudes to the ICT education of minors in care are sensitive to authority style and methods, pace and rhythm of the teaching and learning context, as well as minors' contact with kin:

> *The targets of the lessons or the topics must be minimal. Tutors cannot be rigid with regards to having a number of topics to cover…the tutor must go at a slower pace. If the tutors are too rigid and try to contain a curriculum; and do not manage, they will probably have head-on difficulties with the children. We even experience this at school. There are certain teachers who, despite knowing that they have a challenging class, still try to complete the full syllabus. In reality, it does not work like that. The tutor must work with the children's pace* (Social worker, Appoġġ residential home).

> *Even the day of the week makes a difference to the children, if the children visit their natural families in weekends and we try to organise something on a Monday, the children are all over the place. On the other hand, if we organise something on a Friday and the children are looking forward to the weekend because they will be visiting their family, then that would also be different* (Carer, Catholic Church residential home).

Discussion

Notwithstanding limitations of sample representation in the quantitative component of the research design, this study's participants perceptions concerning knowledge, skills and familiarity with ICT equipment corroborate findings of previous research that flagged differences in use and quality of knowledge among minors, even of the same age (Enyon & Geniets, 2016). Indeed, although this study found a gap between use of ICT for formal purposes (e.g., office tools) and the prevailing use of ICT associated with less formal content and platforms (games, social media, streaming and downloading); gaming, streaming and downloading prevailed particularly among the 5–11-year-olds in a statistically significant manner. The study found no significant difference between participants' uses of ICT and these aspects. Yet it identified statistically significant gender gaps in the uses of ICT among participating minors: namely, a prevalence of use of social media among girls, and a prevalence of gaming, streaming and downloading among boys. These findings can well inform ICT education entry points, aims, learning outcomes and choices of platforms and resources that are age- and gender- sensitive; also, because the findings of qualitative data analysis have shown aptitudes to ICT education of minors in care are sensitive to authority style and methods, pace and rhythm of the teaching and learning context.

The relative comparability of use of ICT for social media (19.0%) and for school/education purposes (15.9%) infers a balance between use of ICT for formal educational purpose and use of ICT for less formal or entertainment purposes. This suggests effective parental/guardian supervision with respect to limiting use of specific social media platforms to younger cohorts; which augurs well for ICT education that integrates responsible and collaborative parental/guardian involvement, across all age groups. The younger 5–11-year-olds significantly prevailed among those already getting help from family – suggesting the existence of good practices, which further qualitative research can shed more light upon. Bearing in mind limitations of sample representation in the quantitative component of the research design (discussed in Section 5.5), effective parental/guardian involvement in ICT education could prevent potentially perilous ICT engagement among those of ages 12-14 years, because these significantly prevailed among those not getting help with using ICT from family, friends, school or online fora.

Findings also make a case for family-based ICT education because it found (particularly, qualitative) evidence of lack of ICT skills among

parents/guardians. In this regard, Hatlevik et al, (2018) found family circumstances among factors impacting the acquisition of ICT skills; whilst further research flagged deficiency in parental support when parents feel that they do not possess the necessary knowledge (Melkman & Benbenishty, 2018). This study extended the analysis to minors living in residential care with evidence of medium-to-long-term negative impact of the household/family setting minors lived in prior to moving into residential care on ICT education.

The involvement of parents/guardians in ICT education targeted at the population of interest could well compensate for the disinterest among participating minors with respect to enhancing ICT knowledge, which could be interpreted in the light of previous studies that qualified disinterest as a possible by-product of digital exclusion (Burns & Gottscalk, 2019; Paus-Hasebrink, et al., 2019). On the other hand, Melkman & Benbenishty (2018) found that robust support networks, especially for minors in care, result in improved outcomes and better performance. It follows that a family-based approach to ICT education that involves the parents/guardians of the population of interest has potential for mitigating the risk of intergenerational digital exclusion. Indeed, this study's participants valued contextual factors such as family and support systems, access to equipment and opportunities for usage; and the study has also shown aptitudes to ICT education of minors in care are sensitive to minors' relations with kin. Further validation lies in Diogo et al.'s (2018) research findings on how, notwithstanding government distribution of laptops to school children aged 6-10 years (which echoes state provision in Malta), family context is a crucial influence in how minors use their devices and the skills they practice.

Family ICT education should factor in minors' capacity for autonomous, self-directed ICT learning and problem-solving. This study found gaps between the professionals' assessment and the minors' in care assessment of the latter's knowledge, skills and familiarity with ICT equipment. Whilst inequalities of access to and familiarity with ICT flagged by professionals need to be factored into the planning, design and development of ICT education for the minors under study; yet so do the more positive minors' in care self-assessment. Indeed, this study found a statistically significant prevalence of self-learnt ICT users among minors who stated having no problem with ICT equipment, infrastructure etc., as well as among those who flagged problems related to slow Internet connection. These findings flag assets to successful ICT learning

among self-learnt users that include higher expectations from the equipment and critical capacity.

Conclusion

Main Findings

Informed by mixed-methods research carried out as part of project *Star Kids,* this paper identified gaps and needs among minors aged 5-17 years, residing in out-of-home care and/or making use of community-based welfare services; and an understanding of the extent and ways such gaps and needs impact this cohort's engagement (at the time of the study and prospective) with ICT education.

Broadly speaking, the study found the vast majority of minors used ICT frequently, irrespective of gender, age cohort and whether, at the time of the study, they lived in a residential home or not. The prevailing uses comprised gaming and streaming, followed by social media and Microsoft office / school-related usage, respectively.

More specifically in response to the research questions of this study, this paper's analysis flagged a gap between the usage of office tools and of games, social media, streaming and downloading. However, the relative comparability of use of ICT for social media and for school/education purposes suggests a balance between use of ICT for educational purposes and use of ICT for less formal or entertainment purposes.

Bearing in mind limitations of sample representation in the quantitative component of the research design, sex-and age-based differences/gaps in ICT usage identified in the analysis of this paper are also noteworthy. In particular, gaming, streaming and downloading prevailed among boys and among the youngest cohort. Use of social media prevailed among girls. The majority of minors participating in this study described themselves as self-learnt users of ICT - irrespective of sex, age-cohort and whether living in a residential home or not. This augurs well for engagement with ICT education designed to develop autonomous, self-directed learners. Findings can well inform gender-based entry points to further ICT education.

Notably, residence place of participating minors did not significantly impact minors' perceptions on help required and main problem / issue encountered concerning use ICT. However, boys prevailed among minors stating they did

not need help; whilst participants of ages 12-14 and 15-17 years stating they received help from friends, family, school, online fora comprised a statistically significant minority. Problems with using ICT prevailed among minors who did not perceive themselves as self-learnt users. Living in a residential home or not was found to have no correlation with this trend.

Complaints on slow Internet speeds or devices are noteworthy. No significant difference emerged between problems and issues encountered when using ICT and participants' sex, age cohort, and place of residence (with family / residential home). Yet qualitative analysis flagged limited ICT skills among those with lack of access to and familiarity with ICT prior to moving to residential care.

Limitations of the Study

The care order status of the minors' cohort under study limited access to participants; and despite many efforts the research team did not manage to recruit participants living in foster care. Limited participation could also have been influenced by school commitments and assessment / examination periods as well. Participation in data collection during such periods could have violated conditions of the care order of specific minors; though the research team could not gauge the extent of this limitation due to data protection matters.

Consequently, the overall margin of error for the quantitative component of the research design stood at +/- 9.7% at 90% confidence interval. Though broadly considered as acceptable (Schutt, 2012); the research team took care in presenting correlations emerging as statistically significant (or not) with caution; and corroborated or elaborated findings with qualitative data evidence, whenever possible.

It is also notable that, to enhance user- and child- friendliness of data collection and in line with recommended research ethics, the research team could only probe minors for replies to a certain extent. For instance, in the questionnaire, the research team limited requests for elaborations or qualifiers of responses of other categories, or to rank or rate responses; particularly when collecting data from minors.

Timeframes and funding matters, determined by the objectives and scope of the broader *Star Kids* project, inferred it was not possible for the research team

to recruit a control group comprising minors neither living in residential care, nor benefitting from community-based welfare services to control for spurious correlations and fortify the external validity of the findings.

To mitigate the above limitations, the research team used a triangulated, qualitative and quantitative research design. More specifically, the mixed-methods research design and the involvement of participants that included minors in care and/or benefitting from community-based welfare services, related professionals, and parents / guardians, enhanced the internal validity of the findings. Additionally, the authors of this paper focused the discussion on matters that could be substantiated by the data available, namely: ICT skill gaps and needs existing among minors aged 5-17 years who, at the time of the study, resided in out-of-home care and/or made use of community-based welfare services; and the extent to and ways in which the identified gaps and needs impact this cohort's engagement (actual and prospective) with ICT education.

Recommendations

Recommendations concerning the development and provision of ICT education for vulnerable minors that emerge from this paper's discussion include:

Policies targeting family-based ICT education and ICT education enriched with parental /guardian involvement. More specifically, the findings of this study flag the need to empower parents and guardians as ICT users and as guardians of the ICT usage of the minors they are responsible for. Policymaking in this area would also contribute to the culling of intergenerational limitations in digital literacy and competences.

Development and provision of ICT education programmes that equitably develop autonomous and self-directed learners by factoring in different levels of knowledge and skills of vulnerable minors; and that dwell on existing competencies and patterns of ICT usage (e.g., downloading, streaming (particularly for boys); and social media (particularly for girls). The design of ICT education programmes also needs to factor in the complexities of access to minors in care, scheduling difficulties, and socio-psychological needs. ICT education programmes should be formally accredited by the Malta Further & Higher Education Authority (MFHEA) to enhance the repertoire of formal qualifications of the targeted cohorts.

Practices targeting the prevention of siloed ICT engagement, particularly of the cohorts of the population under study comprising males, minors of ages 5-11 years and minors in residential homes with low socio-economic status family backgrounds.

Practices and technologies that quality assure accessibility and quality of help sources supporting ICT education.

Auditing and quality assuring ICT facilities in residential homes and community centres, with the intent of upgrading as necessary.

A promotional campaign targeted at minors in care or minors benefitting from community-based welfare services to stimulate the interest in formal ICT education.

A national campaign to strengthen public awareness of the above and to showcase good practices.

Further research on good practices of parental/guardian involvement in the ICT education of vulnerable minors, of which existence was flagged in this study's data, particularly among 5-11-years-olds. Further research is also highly recommended to identify and understand any impacts of COVID-19 (i.e., year 2020 onwards) on the validity of findings discussed in this paper that are informed by analysis of data collected in 2018.

Ethical approval:
Ethical clearance for this project was received from the Faculty for Social Wellbeing Research Ethics Committee (FREC), University of Malta on 13 April 2018.

Conflict of interest:
No conflict of interest was registered.

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