

HELLO

WORLD

Pilot: Phase 01

15 February, 2017

Pilot: Phase 01

An Analysis of the Hello Hub use one year since deployment

The research outlined in this report has been conducted
on behalf of the Lessons For Life Foundation

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Acronyms & Terminology

LFLF

Lessons For Life
Foundation

SITC

School In
The Cloud

PFA

Projects
For All

PHW

Project Hello World

URL

Uniform Resource
Locator

**Life wide
learning**

Educational philosophy
that focuses on the
opportunity to learn
that exists throughout a
child's day.¹

Geotag

Refers to location
coordinates gathered by
a geographic positioning
system.

**Out of
school
children**

Adolescents and youth
who are school aged,
i.e. between the ages
of 6 and 17, but who are
currently not enrolled
in school.²

¹ — Friedlander, E., Dowd, A.J.,
Borisova, I. & Guajardo, J.,
2012.

² — UNESCO Institute For
Statistics, 2016.

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Executive Summary

Background:

The following research has been carried out by SOLE central at Newcastle University, a global hub for research into self-organised learning environments, on behalf of the Lessons For Life Foundation and in collaboration with Projects For All. The research considered three Hello Hubs built in Uganda between October and December 2015. The research is a compilation and analysis of seven months of usage data, as well as user surveys carried out 13 months after the installation of the Hubs. The objectives of this report are to provide insight into the impact of the Hello Hubs through proxy data with a scope of analysing the use of, both, system and Internet activity, as well as to give insight into the users themselves.

Methodology:

The research focussed on what the Hello Hubs are generally used for, what the Internet available on the Hello Hubs is used for and who the users are. The data has been collected through a combination of data scripts and survey responses. In order to answer the research questions, three types of proxy data have been designed to gather activities and to analyse and draw conclusions from. A System Use Data pull assessed seven months of Hello Hub application and offline usage. An Internet Usage Data pull captured 1,431,149 raw URL entries. A randomised qualitative community survey recorded 583 interviews across the three Hello Hubs.

Key Findings:

Awareness of the Hello Hubs is extremely high in close proximity of their location. Usage is primarily Internet-based with educational games being the second most important application. Video Communities account for just over half of all site visits, primarily through YouTube. This data, combined with survey responses, shows predominantly non-entertainment usage (73%) and provides significant evidence in support of Hello Hubs as Lifewide Learning delivery systems. The Hubs are used overwhelmingly by those who are of school age (75%), of which almost 25% are considered out-of-school children. Of those registered in school, primary age children represent the majority of users (59.68%). There is a significant gender disparity with 72.9% of users being male. However, beyond the age of 29, the trend reverses, especially among non-students.

Key Recommendations:

The research provides a number of key recommendations that should be considered when building future Hello Hubs, as well as to inform further evaluation.

- The data illustrates compelling evidence of self-directed and life-wide learning.
- Several formative assessments could be used to provide more sophisticated analysis on educational outcomes by term (for both children in and out of school), user behaviour (against frequency of use), as well as core competency outcomes according to level of use.
- Further analysis of the breadth of YouTube usage via an automated categorisation script would help overcome the limitations of stem URL assumptions.
- Additional information around the social context of gender disparity of Hub users (and in particular the change in gender disparity by age of user) would provide more extensive evaluation capability.
- The ability to identify the amount of time spent at
- URLs would provide more accurate usage data.
- An expanded longitudinal study to assess computer and Internet use over time and impact on user behaviour would yield beneficial information.

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Introduction

2.1 — Background

In October 2015, Projects For All began Pilot: Phase 1 with the support of Lessons For Life Foundation. In this pilot, Hello Hubs —energy autonomous, outdoor, Internet-enabled kiosks loaded with education software—were constructed to address educational deficits in some of the most under-resourced parts of Uganda.

The Hello Hubs were constructed in three different communities across two regions of Uganda. In the village of Kidubuli, a rural-dense subsistence farming community of 3,000 people located 9.2km from Fort Portal, a town with a population of 54,275, the Hello Hub operates on donated land in the village center.

At Tooro High School, a small private secondary school located on the outskirts of Fort Portal, the Hello Hub is located within school grounds.

The third Hello Hub was constructed at St. James Primary School, a small private school located in Katale Bukwenda, a transit suburb with a population of 7,530, just outside of Kampala.

These Hello Hubs have now been operating for 13 months since their completion in December 2015. This research has been conducted to understand the impact of the Hello Hubs in their communities, with particular emphasis on their use through proxy data. The research is a compilation and analysis of seven months of usage data, as well as user surveys carried out 13 months after the installation of the Hubs.

Kidubuli Hello Hub.
Photo Credit:
Project Hello World





**Tooro High School
Hello Hub**
Photo Credit:
Project Hello World

2.2 — Objectives

The objectives of this report are to provide insight into the impact of the Hello Hubs through proxy data with a scope of analysis on use of both, system and Internet activity, as well as insight into the users themselves. This information is populated in form of data appendices, a written analysis, and the requested format of:

- Top 25 URLs accessed, context and insights related to educational and community outcomes.
- Top 100 Internet search keywords, context and insights related to educational and community outcomes.
- Summary of program usage data, context and insights. The program usage refers to the programs users are running on the Hello Hub, e.g. web browser, educational software, office suite, media production, etc.
- Summary of survey data regarding usage context and insights. Survey data refers to data gathered during onsite surveys of the Hello Hub usage, and includes demographic data of anonymous users, and usage data not able to be seen on the system, such as collaborative usage.

Each of these items are provided in both, a readable raw data format as well as a synthesised summary and analysis of each and in sum, inclusive of both research methodology and recommendations for considerations moving forward.

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Methodology

3.1 — Research Questions

The research questions to be answered by this report are:

- How is the Hello Hub system being used?
- How is the Internet used on a Hello Hub?
- Who uses a Hello Hub?

3.2 — Research Design

In order to answer the research questions, three types of proxy data have been designed to gather activities and to analyse and draw conclusions from. Of those, two are system data pulls, assessing seven months of Hello Hub application and offline usage, as well as over 1,431,149 raw URL entries. The latter being a randomised qualitative survey of 583 community members across the three Hello Hubs.

The Internet Usage Data is derived from a quantitative data pull and custom categorisation methods to answer research questions related to Internet use. This data is placed into a central repository database for organized recall and categorisation including the objectives outlined in section 4.2.

The System Usage Data utilises quantitative data pulls to answer the research questions related to system use. This data is placed into a central repository database for automated, organised recall and categorisation including the objectives outlined in section 4.1.

The User Demographic Data uses qualitative methods to answer the research questions with regard to the Hello Hub users. This information was collected through an inductive methodology in face-to-face interviews. These were conducted by PHW staff with the aid of a GIS survey application.

The following table summarises the methods used to answer the research questions:

Table 1
Methodology

Research question	Data type	Acquisition method	Instrument used
How is the Hello Hub system used?	Internet usage data	Usage script and categorisation	Custom script
How is the Internet used on a Hello Hub?	System usage data	Usage script and categorisation	Custom script
Who uses a Hello Hub?	User demographic data	In-person survey	GIS survey application

3.3 — Instruments

To collect the proxy data, three instruments were used to gather and organize all data points. For data that displays how people use Hello Hubs, PFA engineers developed a script to capture information on system application use and internet use to organise data for analysis. These data points have been organised into ongoing databases which have been structured to be built upon for additional input, eventually in an automated form. For data that references users, a survey application was used to record responses of community members that logs, organises, and records geolocation coordinates.

See Appendix 1 for the Usage Collection Script.

See Appendix 2 for the Survey123 ArcGIS by Esri, a geographic survey application.

3.4 — Sample

The sample of **System Usage Data** is a purposeful cumulative data set, including all system activity beginning in 6 July 2016 until 6 January 2017 — a total of 14,844 uses. The data is pulled from an SQLite database where the information is logged and then compiled by unique application type and further categorised by kind (see Appendix 3 for data).

The sample of **Internet Usage Data** is a purposeful cumulative data set compiled from the total number of URLs accessed since the script began on 2 July 2016 until 6 July 2016. The total URLs analysed were 1,431,149 (see Appendix 4 for data).

The sample of **User Demographic Data** collected is a randomised survey conducted in each Hello Hub community. A total of 583 surveys were conducted: 178 at Kidubuli Village, 301 at St. James Primary School, and 104 at Tooro High School — providing 13,409 points of data for analysis (see Appendix 6 for raw data).

Methodology

3.5 — Data Collection

We deployed the **System Usage Data Script**. The data was collected per Hub via a scheduled process that acquired new data every 60 seconds including every application currently running (including system processes), and any browser history for logged in users. These ‘engagements’ are clicks where the application is opened for use.

We deployed the **Internet Usage Data Script**. The script pulled data that was captured from combined browser use and cleaned from the database before being sent to independent evaluators at School in the cloud for analysis.

Projects For All staff conducted **User Demographic Data Surveys** in the local vernacular language of community members, Rutooro in Kidubuli and Tooro High School, and Luganda at St. James Primary School community.

The surveys were conducted face-to-face at the homes of community members within a proximity of 5km from each Hello Hub. When conducted at a home, a geotag would be captured. When conducted with users at Hello Hubs, a geotag was not recorded. All data was compiled through the application Survey123 for ArcGIS database and sent to independent evaluators at SITC for analysis.

Methodology

3.5 — Data Analysis

The **System Usage Data Script** captured the following information regarding each engagement in a PHW repository and was categorised by the following criteria:

uid	system user id
gid	system group id
pid	system application id
parent_pid	system parent application id
cmd	path to the application executable or URL
info_from	how the data was gathered (used for URL sources)
created_at	date/time the application was run
updated_at	date/time the entry was created
synced_at	date/time when the entry was synced to master server
unique	primary key based on uid, pid, parent_pid & cmd

Application engagements were then categorised and exported into .csv files for sharing and analysis. Categories for the applications were gathered manually from the app launchers as there are relatively few unique apps used.

The **Internet Usage Data Script** captured two types of data for analysis: The first, most frequently visited URLs, populated in both raw and a 'Top 25 Most Visited' list with analysis. The second captured the top Internet search keywords populated in both raw and a Top 100 Search Keywords list.

Regarding search terms, certain terms (e.g. facebook, youtube, google) were combined as they were misspelled, deemed erroneous (single letter search instead of auto-completion of url) or variations. The results are in .csv file format, grouped by search_query and ordered by count with the following columns:

- count — the number of times the search was performed
- search_query — the query performed
- variations — any additional terms included in this querying

Search providers were manually found and reviewed in order to find parameter to gather terms. Some providers have multiple query parameters (such as Google) and all terms were retained for later processing. In addition, the strings were processed to make them more readable (“+” replaced with “ ”), however, hyphens were left as is.

User Demographic Survey Data was downloaded as a .csv file with raw data categorised by query and demographic information. Data was then processed primarily by user and non-user responses, with additional dissection related to gender, age, location, and reported use.

Methodology

3.6 — Limitations

System Usage Data is not set to delineate between duration of use per engagement or concurrent use where multiple applications are in use at one time. Additionally, due to the anonymous use basis of Hello Hubs, demographic information and disseminated correlations cannot be shown in direct relationship with use of applications from this script.

Internet Usage Data is not set to delineate between duration, time, or concurrent use. While the sample size is large, analysis is limited by the absence of a control group. Additionally, the data is collected and analysed in bulk, without being able to delve into disseminations of a succession of decisions made while engaged in a single user Internet session. Internet usage cannot be shown in direct relationship with demographic data, except for drawing correlations between overall use and overall user population.

User Demographic Data is limited to the responses given by participants. It is not believed that beneficiaries have incentive towards biased or skewed responses as the survey does not serve the purpose of indicating future change or addition to Hello Hubs.

Surveys were primarily concentrated on interviewing participants at random at their homes in pursuit of an authentic perception of Hello Hub users as a percentage of the population. While surveys were conducted at all times of day, responses are limited to those who were at home upon interviewers arrival. Thus, the number of users, as a percentage of the population, is potentially higher as few surveys were conducted at Hello Hub sites themselves.

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Results

Results indicate that communities in which Hello Hubs are located have a high awareness of their presence, as well as a high use among their members. Data highlights frequent, varied use among a userbase that is primarily youth-oriented. The following results disseminate these and other findings.

4.1 — How is the Hello Hub system used?

Data collected on the Hello Hub system has revealed a narrow focus of use in application usage. Of the total number of engagements, the Internet browsers available are the most used of any application. Mozilla Firefox opened 9,733 times, constituting 66.58% of clicks of all applications. Combined with Chromium, the two browsers account for 82.37% of application engagement. Third to these applications is GCompris, an education suite built for learners between the ages of 2 to 10, with 6.58% of total engagements. Education games together account for 9.92% of total use. Beyond the aforementioned applications, the OfficeLibre suite encountered the most use at 3.08% or 450 engagements. See Table 2 for full results.

Table 2
Top applications accessed

Click Ranking	Engagements	Unique ID	Categorization	% of Use
1	9733	/usr/lib/firefox/firefox	WebBrowser	66.58%
2	2308	/usr/lib/chromium-browser/chromium-browser	WebBrowser	15.79%
3	962	/usr/games/gcompris	Education;KidsGame;Game	6.58%
4	450	/usr/lib/libreoffice/program/soffice.bin	Office	3.08%
5	406	/usr/games/ri-li	Game;ArcadeGame	2.78%
6	222	/usr/lib/tuxmath/tuxmath	Education;Math	1.52%
7	192	/usr/games/sol	Game;CardGame	1.31%
8	180	/usr/games/ktuberling	Game;KidsGame	1.23%
9	69	/usr/lib/thunderbird/thunderbird	Email	0.47%
10	25	/usr/games/einstein	LogicGame;Game	0.17%
11	22	/usr/games/gcompris-gnuchess	Game;BoardGame	0.15%
12	16	/usr/games/atomix	LogicGame;Game	0.16%
13	14	/usr/games/blinken	Education;KidsGame;Game	0.10%
14	6	/usr/games/gnome-mahjongg	Game;BoardGame	0.04%
15	6	/usr/games/gnome-sudoku	Game;LogicGame	0.04%
16	6	/usr/games/laby	Game;LogicGame	0.04%
17	1	/usr/games/gnome-mines	Game;LogicGame	0.01%
18	1	/usr/games/tuxtype	Education;Typing	0.01%

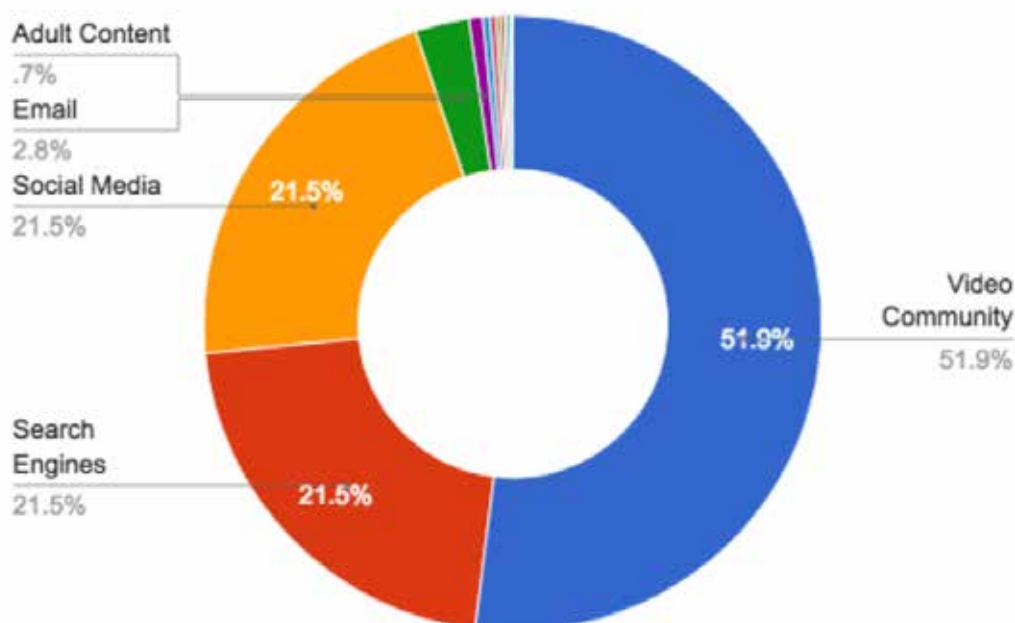
Results

4.2 — How is the Internet used on a Hello Hub?

Internet use was collected in two proxy forms. URLs were compiled in a “Top 25 most frequently visited list” and “Top 100 most searched terms” typed into the search engines. Of all URLs, Video Community sites, i.e. sites where users can watch and upload videos, accounted for 51.9% of all visits, with YouTube being the most frequently visited site. Social Media sites, including Facebook, Twitter, Google+ and LinkedIn, represent 21.5% of sites visited, search engines account for 21.5%. Of the remaining 6.8%, Email accounts for 2.8% while Adult Content accounts for 0.72% of all sites visited. See Figure 1 for overall results.

Internet search terms highlight strong similarities with most frequently visited URLs. “Facebook” has been identified as the most searched term with 29.3% of all searches, followed by “youtube” and “gmail” at 14.55% and 5.03% respectively. “xxx”, or explicit adult content, accounted for 3.51% of all searches. See Appendix 4 for Top 25 URLs visited.

Figure 1
Top URL use by category



Results

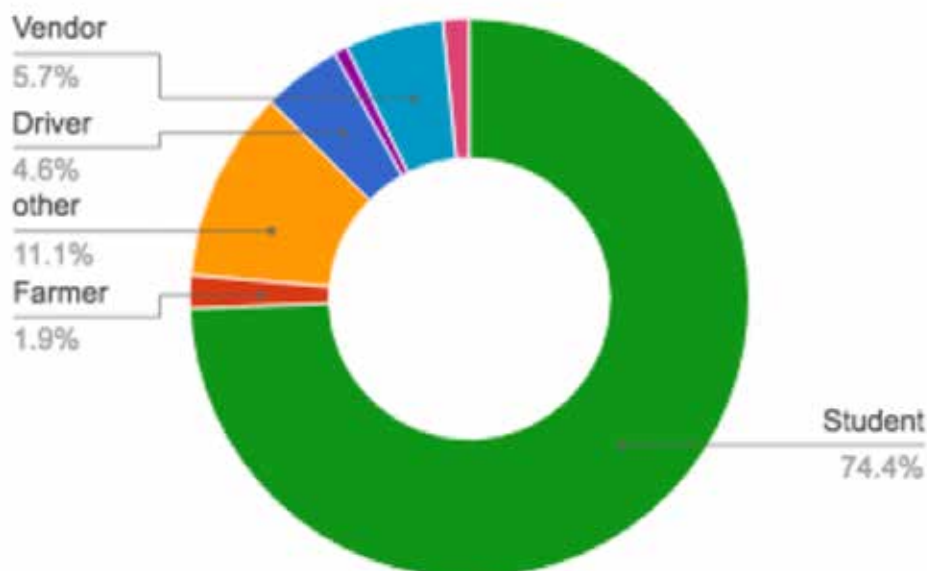
4.3 — Who uses a Hello Hub?

The data collected during this research has provided a wide range of insight into user demographics in both natural and social characteristics. The responses also provide understanding of the use of Hello Hubs in, both, interest type and frequency. These characteristics are described by user age, occupation, frequency of use, type of use, and sub-combinations of these characteristics as found in high frequencies.

Of all the individuals surveyed, the majority (84.4%) reported that they know about the Hello Hub in their community. Half of them (50.2%) indicated they have used the Hello Hub before. The majority of users live within close proximity to the Hello Hubs. While a percentage of users commute a notable distance of up to 120 minutes, the mean time of commute is only 11.56 minutes and the median time 5 minutes. The vast majority of users (93.84%) walk to the Hello Hubs, the remaining users arrive by bicycles or private taxis .

The majority of Hello Hub users are of school age, with 74.4% being either students in school or students who have dropped out but are still eligible for enrollment. Other significant user groups are vendors, drivers, and farmers. 11.1% did not find a common category. Of the student population 75.4% are actively registered in school. The remaining 24.6% are considered out-of-school children. Of those registered in school, 59.68% are students in primary school, 23.6% are enrolled in secondary school and 16.72% attending vocational courses or tertiary education. See Figure 2 for complete details.

Figure 2
Users by occupation

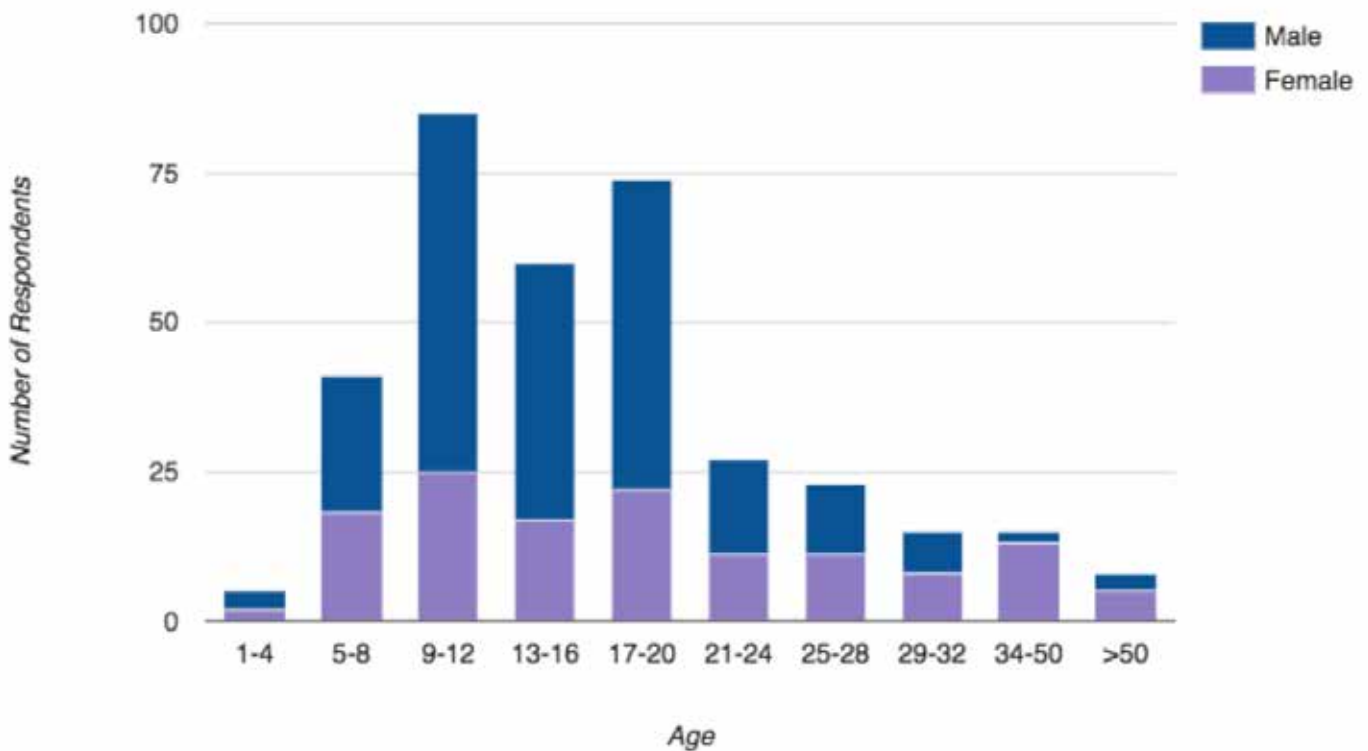


Results

4.3 — Who uses a Hello Hub? (Cont.)

There is a significant gender disparity amongst all users of the Hello Hubs. Males are largely overrepresented at 72.9%, compared to females at 27.1% of users. Once users reach the age of 29, however, the trend switches — especially amongst non-students. Refer to Figure 3 for details.

Figure 3
Gender disparity per age



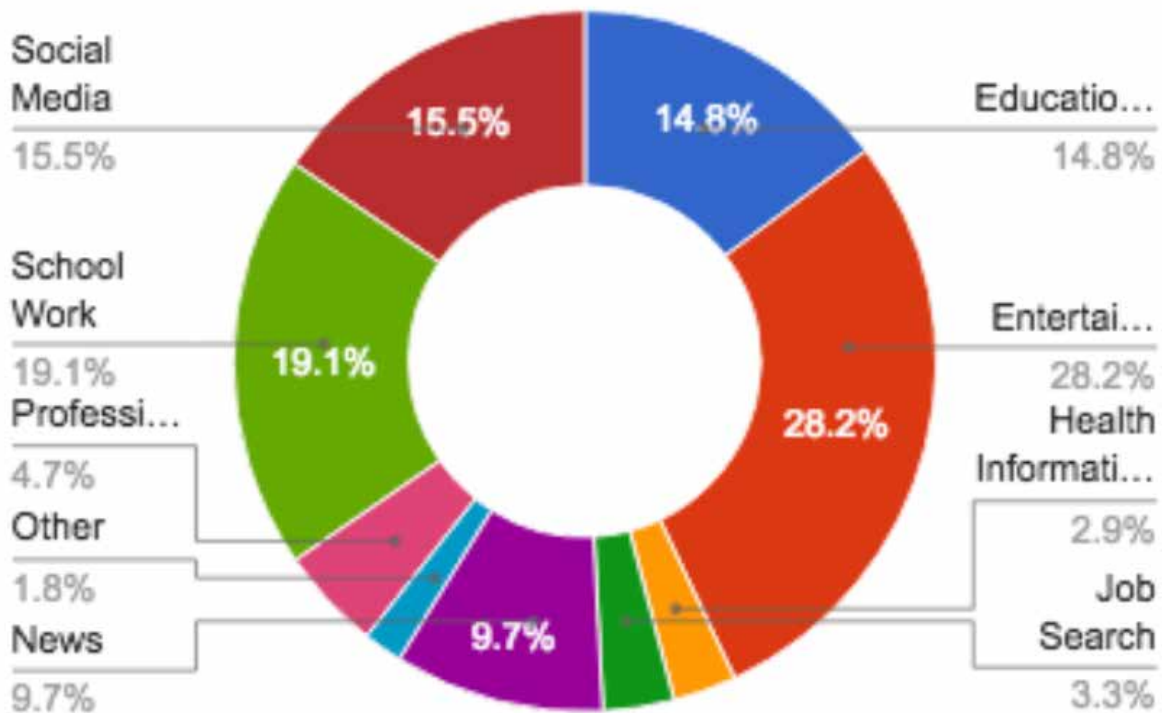
Results

4.3 — Who uses a Hello Hub? (Cont.)

Frequency of use was inquired on the basis of how often the Hello Hub is used, i.e. 1 to 3 Times Per Month, 1 to 2 Times Per Week, 3 to 4 Times Per Week, 5 to 6 Times Per Week, 7 Times Per Week, or more than 7 Times Per Week. Frequent Users, indicated as those who use the Hello Hub more than once per week, constitute the gross majority of users. 93.5% use the Hello Hubs at least once per week, 54.5% at least 5 times per week. 50.9% of users use the Hello Hub in their community mostly during evening hours throughout the week. Of these, 36.8% use it during weekday evenings. Contrastly, only 16.4% of users use the Hello Hubs during morning hours of the week.

Users indicated a varied interest when using the Hello Hub. Four main categories of use — Entertainment, School Work, Social Media, and Educational Games — composed 77.6% of all reported activity. Entertainment—defined as non-educational, homework, or professional related work—constituted the largest portion of use at 28.2%, followed by School Work at 19.1%. Of the remaining activities, News was the largest category at 9.7%, followed by Professional Work at 4.7%. Job Search at 3.3% and Health Information at 2.9%. The remaining 1.8% was beyond the scope of pre-selected categories. See Figure 4 for more details.

Figure 4
Use by type

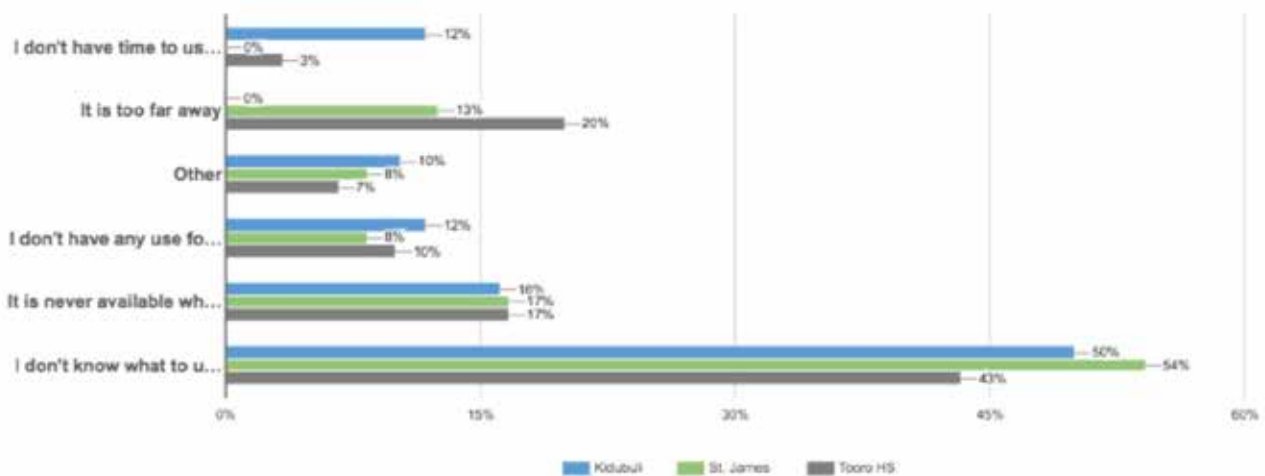


Results

4.3 — Who uses a Hello Hub? (Cont.)

Of those who reported that they have not used a Hello Hub before, lack of knowledge what to use it for was most consistently reported across all Hub locations (43% at Tooro High School, 50% at Kidubuli, and 54% at St. James Primary School). This response was consistent across genders with 52.7% of males and 43.8% of females citing lack of knowledge for use as their main reason for not using the Hello Hubs. See Figure 5 for details.

Figure 5
Reasons for not using a Hello Hub, by location



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Discussion

5.0 — Discussion

The broad categorisation of domains such as high YouTube use, limit the ability to draw causal conclusions without further investigation. However, this data, combined with the findings of the user surveys, reveal fascinating insights into how popular sites are used and how users feel they are interacting with content. The resonance of content use beyond entertainment, accounting for a collective 73.8% of use, indicates widespread Lifewide Learning use of the Hubs. These appear to be varied uses spanning in part to academic preparation, social connection, as well as practical information for everyday life. This variance of response would indicate a textbook definition of Hello Hubs as a potential delivery system for Lifewide Learning which has been identified by recent studies as the most effective complement to academic success in formal academic settings. It is also essential for the development of critical learning skills in functional literacy and numeracy outside the scope of formal academic settings. Further, it provokes interesting questions in how far the categorisation and the perception of educational activity differentiate.

- With regard to “Adult” content it is important to emphasize that some of the Hello Hub communities have chosen to implement adult content blocking. As a result, even though the adult URL is logged in the system as “accessed”, no content on that page was actually viewed.
- The use of formal education gaming applications shows significant interest in logic-based games. Games with user interfaces that are complex and colourful, and which are considered to be highly engaging, are most often used.
- While there seems to be a disproportionate use of the Hello Hubs by children and youth compared to adolescent Hello Hub users, the numbers actually correspond with the distribution of the population of Uganda. Meanwhile, Youth (aged 15-29) are significantly overrepresented at 45.4% of all Hello Hub users, compared to the 27.8% of the Ugandan population they represent. Adults (aged 30 and over) are even more underrepresented, as they account for just 4.3% of all Hello Hub users compared to the 24.3% of the Ugandan population they make up.³
- While there is a noticeable disparity in overall female usage, there is consistent female representation under the age of 8 and above the age of 25. These findings, prompt questions surrounding use by isolated age groups. In the Demographic Usage Survey several respondents of female gender within the age range of 9 to 24 indicate that the high use of the Hubs by males, as well as the communal nature of the Hub, make the environment socially intimidating for them.
- The strong interest in using the Hello Hub from children, both, in and out of school, provokes questions of how relevant content is for formal academic study, as well as for the the development of lifewide skills over time in, both, age and exposure. Equally, a comparative analysis of Internet use by age, including frequency, duration and type of use, would provide a level framework of comparison to the same use by age within existing Western context to contribute to the larger understanding of technology assimilation and digital learning.⁴

³ — Uganda Bureau of Statistics, 2016.

⁴ — Holloway, D., Green, L., & Livingstone, S., 2013.

06

Recommendations

Given the data findings and the aforementioned discussion, the following recommendations can be shared:

- Given the large amount of time spent on YouTube, a further analysis how the site is used—perhaps in the form of an automated categorisation script—would reveal more accurate indications of use by topic rather than site type. This would delve deeper into more accurate proxy data which could help overcome the limitations of assumptions that the stem URLs provide.
- As highlighted in the limitations of this study, to be able to identify the amount of time spent at each URL visit would yield a more accurate representation of Internet use.
- The isolated gender disparity by age is an interesting observation, and it would be valuable to explore the social context of these findings through further research. Doing so could promote effective interventions in the Hello Hub communities (e.g. outreach programmes specifically targeted at female users) which could lead to a more heterogenous user group.
- The findings outlined above provide a unique, retroactive snapshot of Internet usage in three different locations in Uganda over a period of seven months. From the data collected it was possible to start identifying patterns of Internet usage that have emerged during this period, and these patterns have been compared with Internet usage in different countries around the world. It is important to note, however, that the majority of research in this field is longitudinal, i.e. the aim is to understand if an individual's behaviour to seek information in the Internet improves with increasing experience.⁵ There is also an interest in understanding if the type of content that is being viewed online changes over time, and whether it becomes more 'useful' once the novelty of using the Internet begins to fade.
- More direct data with regard to educational attainment could be captured by facilitating formative assessments. Tracking literacy and numeracy progression with baseline data while measuring frequency of Hello Hub. This would provide insight on Hello Hub impact on these core competency skills in both students registered in school and out-of-school children. Further analysis of how comparative lessons are being delivered through the Hello Hubs could give an insight into the impact of content assimilation on school children.

⁵ — Cothey, V., 2002

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References / Appendices

7.0 — Reference

Cothey, V. 2002 A longitudinal study of World Wide Web users' information searching behavior. Bristol, UK: University of Bristol. Available at: <http://dl.acm.org/citation.cfm?id=506073>.

Friedlander, E., Dowd, A.J., Borisova, I. & Guajardo, J., 2012. Life-wide learning: Supporting all children to enjoy quality education. NY: UN Women & UNICEF. Available at: <http://www.worldwewant2015.org/node/283236>.

Friedlander, E., Goldenburg, C. 2016. Literacy Boost in Rwanda: Impact Evaluation of a Two Year Randomized Control Trial. Stanford, CA: Stanford University. Available at: https://rwanda.savethechildren.net/sites/rwanda.savethechildren.net/files/library/LB%20Rwanda%20-%202%20Year%20Impact%20Evaluation_1.pdf.

Holloway, D., Green, L., & Livingstone, S., 2013. Digital PDF. Zero to Eight: Young children and their Internet use. London, UK: London School of Economics: EU Kids Online. Available at: http://eprints.lse.ac.uk/52630/1/Zero_to_eight.pdf.

Uganda Bureau of Statistics, 2016. National Population and Housing Census 2014-Main Report. Kampala, Uganda. Available at: <http://unstats.un.org/unsd/demographic/sources/census/wphc/Uganda/UGA-2016-05-23.pdf>.

UNESCO Institute For Statistics, 2016. Leaving No One Behind: How far on the way to universal primary and secondary education? Paris, France. Available at: <http://unesdoc.unesco.org/images/0024/002452/245238E.pdf>

7.1 — Appendices

Instrument 1: Usage Collection Script
[Google Docs Link](#)

Internet Usage Data
[Google Docs Link](#)

Instrument 2: Survey123 ArcGIS by Esri
[Site Link](#)

Internet Keyword Data
[Google Docs Link](#)

System Usage Data
[Google Docs Link](#)

User Demographic Survey Data
[Google Docs Link](#)