

Learning from Digital Games

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Abstract

Most educational publishers are developing pedagogical approaches that go beyond the walls of schools, trying to reach informal educational environments. Research supports the idea that digital games are a good platform to promote children's educational interests.

Most studies conducted so far about children's gaming activities collected data through indirect sources (e.g.: parents), or within settings in which children felt obliged to respond (e.g.: schools). Since digital games are still a source of concern for educators and parents, the results of such studies are significantly biased.

In order to learn about the true impact of digital gaming in Israel, a study was carried out using an innovative approach: assessing children directly and allowing them to voluntarily respond through an online educational platform.

The study provided data not previously available about the number of daily hours most children spend on digital games, which is far greater than found in earlier studies, confirming the hypotheses of many gaming educational experts. The results suggest that children are learning important cognitive and social skills through digital games, and this environment appears to provide a valuable basis for developing evaluation and measurement of such skills as well as of learning processes.

Key words: gaming; digital games, eLearning.

Introduction

The fast pace of the digital world keeps us constantly learning about the latest novelty dramatically exerting impact on our daily lives. There is some agreement that after social networking has changed the way we relate to people, gaming is changing significantly the way we use our "free" time. Moreover, our smart-phones have introduced an exit way (regardless of where we are, work/school/bed/gatherings/on the road) to our social networking and gaming activities. Broadband bolstered our potential to communicate and play with anyone and everyone, changing significantly our experience of community! Gamers today are not isolated but immersed in an ecosystem of constant exchange of information and emotional experiences.

What exactly does "gaming" mean? It has become a buzzword related to any sort of game that has a digital base, any game that is played using a technological device.

Throughout the last few years, we saw an important shift in the type of players, which today includes many different groups of society. According to the latest studies, the average gamer is 30 years of age¹, with a very proportional distribution across age groups (ESA, 2013). A group that has stepped in, significantly, is women, reaching 45% of this group (ESA, 2013), apparently differentiating themselves according to the type of game chosen. There is a constant increase in the number of players, which has grown by 8%, both in the US and the EU (Newzoo Report 2012),² and more recently the gaming industry is reaching out to a much more global market, targeting developing countries due to the rise in their acquisition of technological devices, especially mobiles.

This report will try to shed some light on the tremendous impact gaming is having on a specific group – **kids**. Why is gaming occupying most of kids' interests and daily activity? According to the NPD 2011 Report³, 91% of kids from 2-17 years of age are gaming, an increase of 12.7% from the previous year (compared to an increase of 1.5% in this age range population growth). This growth is especially significant in the sub-groups between 2-5 years, females, and teens. Parents are approaching the gaming world to "connect" to their kids 45% of U.S. parents play with their kids at least once a week (ESA, 2013).⁴

Our hypothesis is that gaming is not only an entertainment activity but it is fulfilling a learning gap in the youngest generations' lives. Gaming has become an effective parallel path of education! We could even say that through gaming they are developing learning skills essential to their adulthood.

Suddenly, experts, from a wide range of fields, are raising their voices to advocate gaming as a significant and very important activity in kids' lives.

According to Yu Kai Chou, Generation-Y grew up gaming, and are used to the ideas of having empowerment, feedback, epic meaning, and social activities within everything. They, therefore, need these mechanisms, that games take for granted, to stay motivated in any other activity they do.⁵ Amy Jo Kim maintains that by playing games kids are developing skills to become digital experts.⁶ Experiences in virtual worlds, especially as "avatars," can significantly influence our behavior in the real world, says Stanford researcher Dr. Fox.⁷ Edward Castranova warns how a generation used to virtual worlds, especially at MMO games, will have a different perspective of the macroeconomy "in an avatar economy, increases in per-capita wealth – which make it easier to accomplish various quests and missions – will lower the challenge level of the game, potentially making it a less interesting puzzle. Growth can be bad"⁸. According to Jane McGonigal, we should multiply by seven the hours of game play in order to survive the 21st century. She argues that "gaming" provides a unique environment which motivates and inspires,

allowing us to be the "best version of ourselves", collaborating to achieve objectives and getting up when faced with failure! Gamers are willing to work hard, if they are given the right challenge, a challenge that matters, that is relevant! Somehow, gaming maximizes kids' potential capacities, while at the same time engaging them in a productive and entertaining activity.

The work of James Paul Gee has been highly influential in developing the credibility of computer games as a medium for learning. Reading and writing (including the interpretation and manipulation of images and sounds such as in computer game play) are not only mental achievements but social and cultural practices with economic, historical, and political implications. "Humans need to practice what they are learning a good deal before they master it. ... The fact that human learning is a practice effect can create a good deal of difficulty for learning in school. Children cannot learn in a deep way if they have no opportunities to practice what they are learning. They cannot learn deeply only by being told things outside the context of embodied actions. ... Good video games involve the player in a compelling world of action and interaction. ... Thanks to this fact, the player practices a myriad of skills, over and over again, relevant to playing the game."⁹

With such a learning potential, how can digital games play a significant role within the educational system? Let us look at the rise and fall of the educational digital games' industry. The success of *Carmen Sandiego* and *The Oregon Trail* triggered the boom of an industry of games with educational content with very promising market opportunities during the 80's and 90's. At the turn of the century, the dream became a nightmare for investors, "a downward spiral that has had longstanding repercussions that still resonate strongly in the current market."¹⁰ Games with huge popularity and commercial success like *Minecraft* and *SimCity*, which have not been designed, developed, or marketed targeting the educational world, are now being considered as having substantial educational value, as for example, [MinecraftEdu](#) and [SimCityEdu](#). Instead of trying to insert games within traditional pedagogical approaches, Katie Salen proposes games as an entryway for educators to build a transition towards the digital life of kids, as the Quest-to-Learn Public School in New York, developed by game-designers, which brings the gaming world as the basis for its pedagogical approach¹¹.

There are many popular games, today, that have made a significant impact on kids' daily lives, changing their perception of where and who can provide them with answers to questions which are relevant to them. Knowledge sources, skills training, content agents/channels, play partners, are all being discovered by kids while they play. What is the power of a *walkthrough* compared to an encyclopedia?

Many games work as rule-based learning systems, creating a world in which players actively participate, use strategic thinking to make choices, solve complex problems, seek content knowledge, receive constant feedback, and consider the point of view of the other. Moreover, they exemplify the complexity of systems. "Understanding and accounting for this complexity is a fundamental literacy of the 21st century" (Katie Salen).

Method

An online survey directed to kids was conducted, using a questionnaire designed to target spontaneous and voluntary responses from kids (6-18 years of age).

Instrument

A questionnaire with open and multiple-choice questions in two language versions: Hebrew and Arabic.

The questionnaire was published online. A "call": *'Do you like digital gaming?'* was published on open platforms of the Ed-Tech publisher CET, without requiring any membership or entrance code. A click at the "call" would take directly to the questionnaire. This approach was created to raise kids' motivation to answer the questionnaire, allowing for voluntary initiative without any incentive from adults (kids did not receive any previous information about the study, neither schools nor parents). At the same time, by having the "call" inserted on platforms with serious connotation to kids, it could raise responsible attitudes towards the questions, avoiding the anonymous joke-type/meaningless responses, typical of online surveys.



Survey period

The Hebrew version appeared on the platform from March 3rd to March 10th 2013 and the Arabic Version from March 14th to April 24th 2013.

Sample

Out of 5036 clicks at the "call", 1019 kids answered the questionnaire (20%, which is an expected rate for online surveys¹¹²). Surprisingly, the great majority of kids completed the questionnaire with meaningful responses. The number of meaningless responses was apparently low because the online format of the questionnaire required all spaces to be filled out, therefore even when the respondent did not have what to say he had to fill in the space with any symbol to be able to complete the questionnaire.

Since the sample was anonymous and auto-selected, we looked at users of these specific platforms during the same periods the questionnaire was published, in order to suggest the potential population from which our sample arose. Our sample showed a considerable similitude in terms of age to the population entering the platforms at the same period. Table 1 presents the distribution of children's ages in the sample. Since the data were derived from voluntary responses, the few subjects younger than 6 years of age or older than 18 were excluded from the sample.

¹ http://wybowiersma.net/pub/essays/Wiersma,Wybo,The_validity_of_surveys_online_and_offline.pdf

Table 1 Age distribution in the sample

Age	Hebrew Speakers	Arabic Speakers	Total
5-7	23	6	29
8	61	16	77
9	106	16	122
10	171	44	215
11	167	51	218
12	134	46	180
13	34	18	52
14	15	2	17
15	10	9	19
16-50	32	22	54
missing	12	24	36
Total	765	254	1019

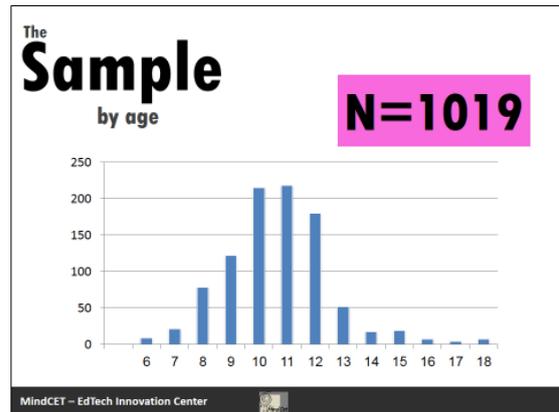
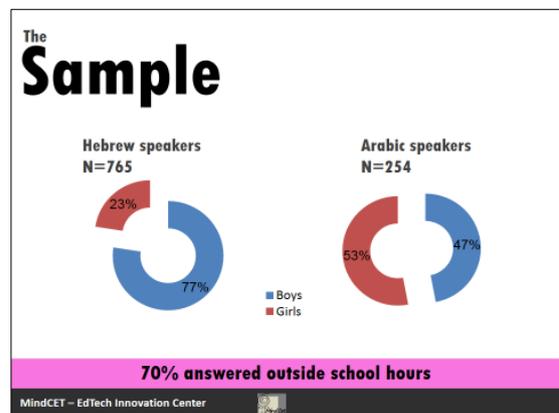


Table 2 Gender distribution in the sample

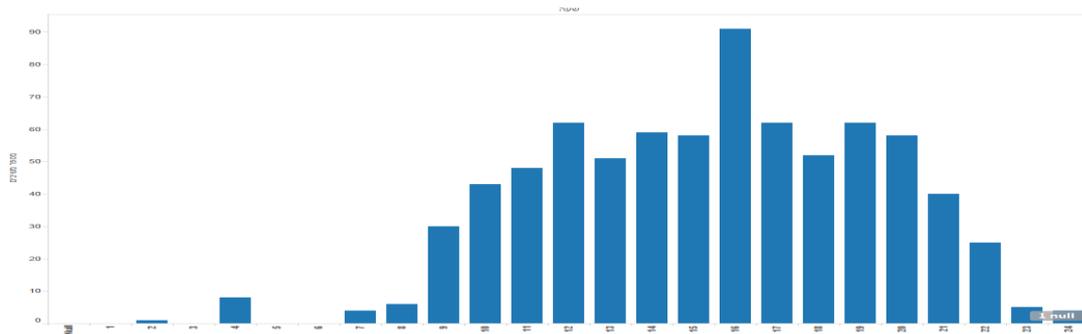
Gender	Hebrew Speakers	Arabic Speakers	Total
girls	176	135	311
boys	589	119	708
Total	765	254	1019



The gender distribution in the sample is shown in Table 2. While in the Hebrew speaking group boys outnumbered girls by a ratio of 3 to 1, the Arabic speaking group showed a ratio of 1 to 1.

Figure 1 shows the distribution of daily hours in which kids answered the questionnaire. It can be seen that kids completed the questionnaire across the day, and since the period included weekends, at least 70% of kids answered out of school hours (8 hrs-15 hrs).

Figure 1: Number of respondents by hour of the day



Results

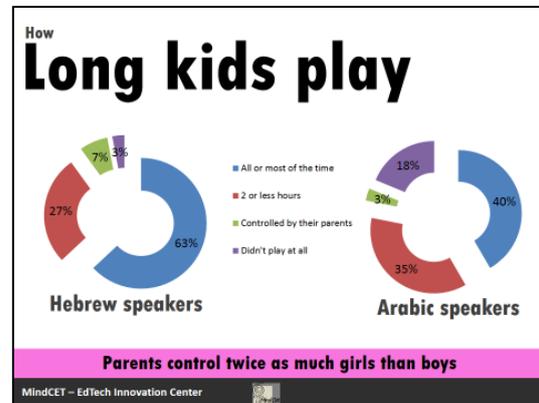
Results obtained for each question

How long do children play digital games every day?

Hebrew speakers: the majority reported they play digital games most of the time after coming back from school (58% of kids said they played all or most of the time, another 5% at least 4-5 hours a day). Only 3% said they had not played at all during the last two days.

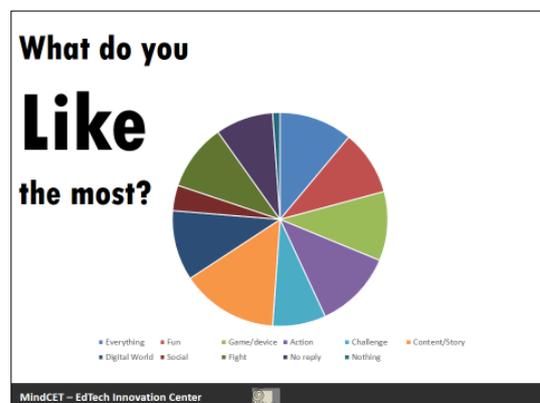
11% of the girls report that their parents control their playing time, compared to only 6% of the boys. Even though the number of hours played was similar for both genders, the distribution among girls was more even: 37% of girls play 2 or less hours and 40% at least 5 hours.

Arabic Speakers: 60% responded that they play less than 2 hours a day and 18% had not played during the last two days, mainly girls.



What do children like the most about digital games?

The kids wrote freely about the things they like the most about gaming and the responses were grouped. Most kids mentioned the environment of the game, the content/story-line and the possibilities the digital space provides, such as the interaction, the freedom, the graphics, the participation in the story-line, the absorption into the game, etc. *"Opportunity to be someone else, to do things that I cannot usually do, that I can play with other people, and develop motor, physical and mental skills"* (12-year-old boy).

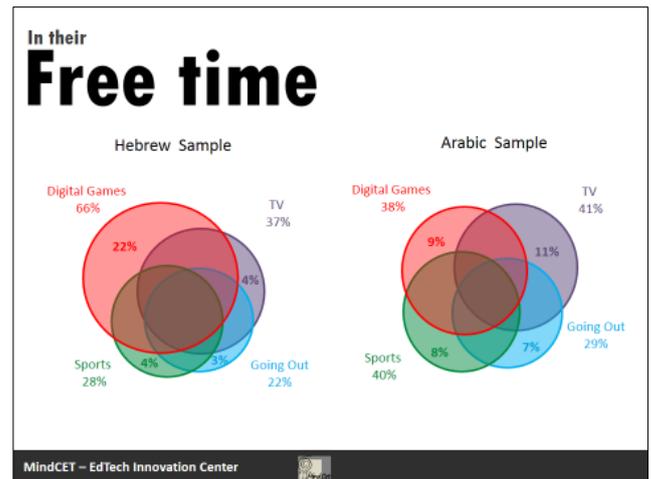


Many answered they like everything about digital games, and mentioned the fun and joy they experience. *"Digital games take you into another world, and it makes you forget all the worries and troubles. They help you not to get angry and they make you enjoy, and have fun"* (12-year-old boy).

Other popular answers were related to the action, the challenge, and the possibility to win, the engagement, the possibility of playing with friends and with other players.

What do children like to do in their free time?

The great majority of the kids said they choose a variety of activities to do during their free time. A significant proportion of Hebrew-speaking kids choose digital games (66%), while among Arabic-speaking kids, games, TV, and sports are equally popular activities



Are digital games good for you?

69.2% of the kids said that playing digital games is good for them mainly because "It is fun", "I learn different things", and "It keeps me busy". The ones who said NO, 12%, justified it by saying that "It drives me crazy/I get stuck" and "My eyes hurt". Arabic-speaking kids mentioned learning reasons twice as much as fun-related reasons.

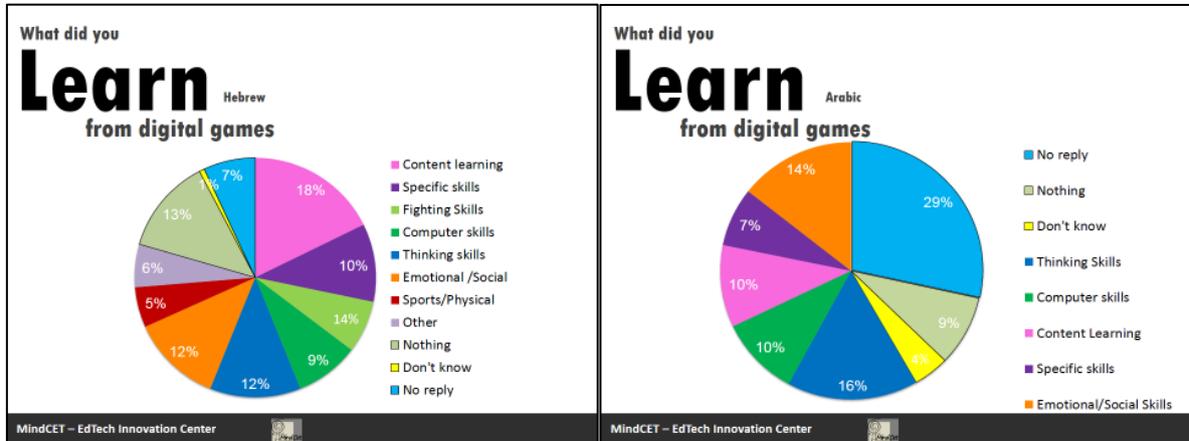
What do you learn from digital games?

Kids were asked to write two things they learned while playing digital games. Based on their written responses the following categories were created:

1. Content learning: English, math, history, language, space, minerals, chemicals, sciences, technology, different countries and cultures, etc.
2. Specific skills: how to fish, how to save money, how to build, how to drive, how to fly and land a plane, how to invest on the stock exchange, how to make swords and other crafts, how to fix electronic objects, how to produce coal, how to make ice cream, how to trade, etc.
3. Fighting skills: how to avoid being hit, fight techniques, strengths and weaknesses, how to shoot, about weapons, etc.
4. Computer skills: how to program, how to search, how to find help on the computer, how to type well and fast, etc.
5. Thinking/Survival skills: lots of thinking, to think fast, right responses, strategy, how to solve problems, how to resolve complicated tasks, how to improve thinking, to find ways to improve after I lose instead of getting upset, to be consistent, tricks, to finish what I have started, to calculate, to concentrate, how to play, etc.
6. Emotional/ Social skills: to win and lose with respect, not to get angry when you do not pass the levels, not to lose control, you learn that you cannot give up, to respect others, important to learn not to fight and make friends with other kids in the game, they can bring you more friends, how to be social, not to get in touch with people I do not know, how to help when people need help, etc.
7. Sports/Physical: how to play soccer, basketball, how to improve my body, etc.

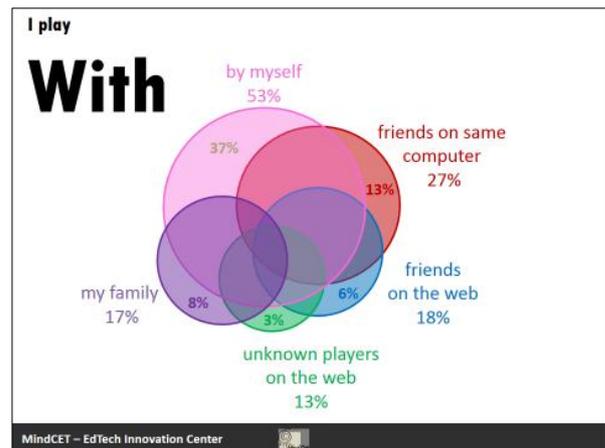
Among the Hebrew speakers, 79% said they learn significant things by playing digital games and 13% said they do not learn anything. They mentioned that they learn, mostly,

in this order: content learning, specific skills, fighting skills, computer skills and thinking skills. Among the Arabic speakers the results were slightly different. 57% said they learn significant things, and 9% said they do not learn anything. However, there was a large percentage of no reply (29%), compared to the Hebrew sample (7%).



Who do children play digital games with?

Asked with whom they played during the last two days, most kids said they played with different people and sometimes, also, by themselves. 37% of kids said they played only by themselves. This result was significantly affected by age, since the older the kids, the less they mentioned playing by themselves. 13% of kids said they played with unknown players on the Web.



Among the Arabic-speaking kids, a larger percentage play with relatives, and less kids play with friends through the Web, as compared to the Hebrew-speaking sample.

Who help children when they get stuck?

Relatives were the first choice of help when needed by kids, followed closely by their friends. Only 11% said they use the Internet to look for help.

There were important gender differences, since girls tend to ask significantly more help from relatives compared to boys, and boys tend to search on the Internet when they need help, significantly more than girls.

An age factor showed that as kids get older they rely less on relatives and more on the Internet.

Most popular games

The written responses comprised a very large list of games, which were grouped by categories: Action and Personal Shooter (FPS), Sandbox/Open World, Platform/Virtual World, Strategy, Mobiles and Social Network. The latter two categories overlap since at Social Network, kids specifically wrote Facebook and not a game name, and many of FB

games are exclusively for mobiles. The 10 most popular were, in this order: Minecraft (Sandbox), Call of Duty (FPS), GTA (Open World), FIFA (Action-simulation), Mikmak (Platform), Temple Run (Mobiles), Mogobe (Virtual World), Ekoloko (Virtual World), Battlefield (FPS), and Counter Strike (FPS).

There were significant gender differences: 50% of boys enjoy Action games (17% FPS, 34% Adventure and Sport). Girls' favorite games are Platform/casual games. FPS were almost exclusively chosen by boys.

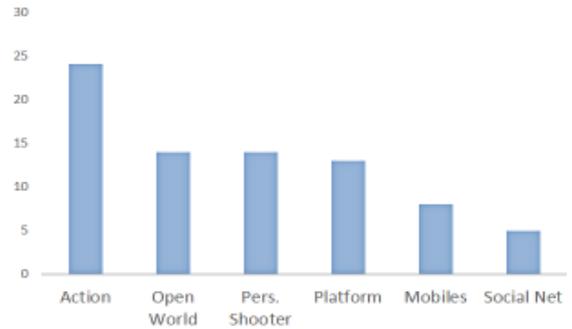
Age was an important independent variable, since with age kids choose less Virtual World and casual games and more games that require a longer engagement and specific development of skills and knowledge (as many of the Action games mentioned, Sandbox, Open World, and Personal Shooters).

Most popular

Games

MINECRAFT IS THE MOST POPULAR GAME

Temple Run is the most popular mobile game among kids and one of the most downloaded Appstore mobile games (Distimo, 2013).

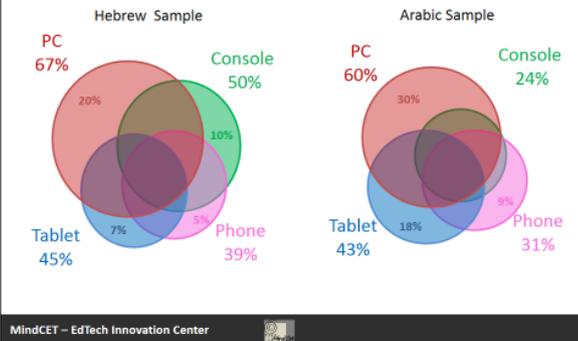


With age, Sandbox and Pers. Shooter become more popular and Platform less. Girls prefer platform and casual games.

Devices

Most kids used a variety of devices, and very few only one device, to play games. The only significant difference between the Hebrew- and Arabic-speaking groups is that in the latter only 24% mentioned playing on consoles (every kid in this group also plays either on a PC or on a phone).

Devices



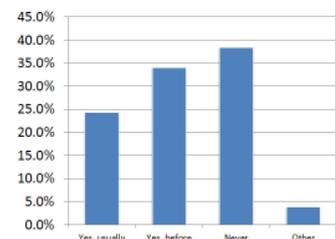
Games and Education

Two questions were related to games and education.

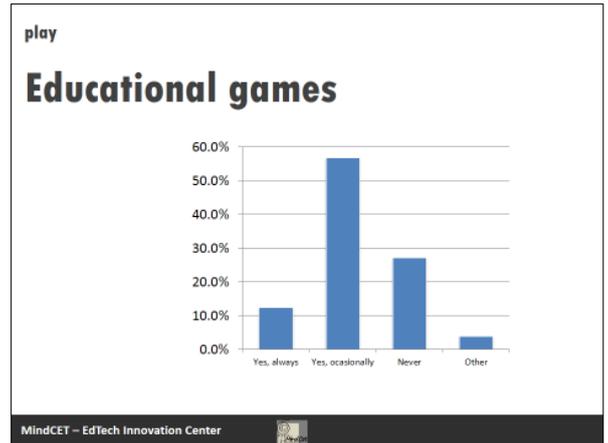
Have you ever played games at school? The majority of kids replied YES. This result could imply their gaming activity took place in their free time, as well as in class time.

play

At School



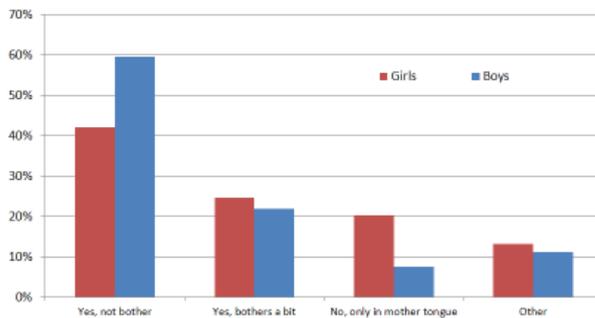
Do you play educational games? The majority of kids replied they occasionally play them.



Language of digital games

Most kids say that the language of the game is not important when they choose a game to play. Most of the "other" answers referred to kids choosing particularly games in English.

Playing games on Foreign Language



Summary and Conclusion

1019 kids, Hebrew and Arabic speakers, voluntarily wrote about their gaming experience. An overwhelming majority said they spend most of their free time playing games because they have fun and learn many relevant and interesting things. Their gaming activity is mainly social, both to play as well as to look for help. The older they get the more they interact with friends and with the WEB, and less with relatives and/or by themselves, which it is expected since kids' developmental social interest starts being significant from 7 years of age. PC is the main gaming device closely followed by console, tablet and phone. Foreign language does not interfere with kids' game play.

These results suggest that Israeli kids' gaming experience express a much more global behavior. Our result of 62% kids playing games with others reproduces the 63% reported by the US Entertainment Software Association (ESA Report 2012). The story-line is a major feature to choose a game. PC is still the most used device to play games with a significant percentage of kids using up to four devices to play games (also console, tablet

and phone), result also found in Europe and US (Newzoo, 2012). MMO games represent a significant choice, especially Minecraft, as well as FPS (GTA, Call of Duty), and among the mobile games, Temple Run.

A few significant differences were found among the Hebrew and Arabic speakers, specially related to the impact of gaming on their daily lives. The latter spends less time playing, and a smaller percentage of the sample play games that require longer periods of involvement.

The great majority of the kids participating on this study believe that by playing games they learn significant things to their lives: they learn things about the world around them, they relate socially, they develop autonomy and skills to find what they need, they learn about the consequence of their acts, and they learn not to give up!

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