Development of skills and talent in videogames: the challenge of higher education in Latin America

Inés Evaristo Chiyong
Grupo Avatar PUCP
Lima, Peru
evaristo.is@pucp.edu.pe

Isabel Mollá Salas
Grupo Avatar PUCP
Lima, Peru
isabel.molla@pucp.pe

Luis Wong Jara
Grupo Avatar PUCP
Lima, Peru
luis@luiswong.com

Pontifica Universidad Católica del Perú

***Abstract*— The present study will show an overview of a research about the relationship between the education of professionals in the South American videogame industry and their real abilities and expectations, as a way to identify the main factors that could drive the development of the industry. In order to achieve this, semi-structured interviews were conducted among participants and organizers of the South American Game Jams in 2012, as well as interviews to South American experts in the game industry. The results showed us that universities in Latin America should take the risk of establishing flexible courses on the real needs of the game industry in the region, which demands more than self-taught professionals. While developers have high motivation for working on videogames, they also identify that they need to improve or optimize not only highly specialized skills but also generic ones like creativity, teamwork, leadership and management.**

Keywords: latin america, skills, higher education, videogame industry, game jam.

I. INTRODUCTION

The videogame industry is one of the most profitable industries in the world. The 2013 Global Game Market Results [1] estimates that this industry will grow up to $70.4 billion worldwide in the current year, which represents a 6% increase compared to the year 2012. They also estimate that Latin American videogame industry will increase in 11%, making $3 billion income during 2013 [1]. Also, in this region, companies are beginning to invest less money in the development of videogames due to the existence of information and communication technologies that allow them to make their product available for more people, like social networks, mobile devices, frameworks and open source game development engines, that allows them to develop good quality videogames at low cost [2].

Although, there have been significant changes in this industry in the last few years, future perspectives about what kind of consoles or videogames will dominate the market are still uncertain. The new technological development has lead the videogame industry, traditionally dominated by the big console manufacturers, to reach the end of its maturing cycle with sales growth rates of one digit and low profit levels [3]. In that same context, new successful business models have emerged with products of lesser value and oriented towards a large consumer market in search of new entertainment experiences [4;5]. Thus, companies are adapting to new paradigms through the development of new products and services aiming at these new consumers [4].

According to the standard economic approach, industrial development is based on its ability to attain the highest productivity levels, for which it is very important to invest in physical and human capital that may help achieve technological changes or innovations. According to this approach, those industries that can obtain the greatest investment in physical and human capital will achieve the greatest development. Thus, local industries are at a disadvantage in comparison to those with greater investment capacity [6].

The role of universities in training professionals in the videogame industry

The videogame industry demands professionals with training applied and oriented towards the design of videogames [7]. Those interested in pursuing a career in such industry, are required to enroll in educational programs specialized in videogame development that can provide them with technical and academic training as state-of-the-art tools [2]. Since training opportunities in this field are still at an elementary level, videogame companies spend a considerable amount of time specializing their employees in skills like programming or game design [2; personal communication, S. Samaniego, 2012]. Nonetheless, in the last years, educational institutions have created programs that will form the kind of professionals that the industry of videogames need.

For example, in South America, there are some academic programs that deal with videogames using various approaches. In Argentina, for instance, educational institutions focus more on development and programming; for example in some universities there are specialized courses in this subject and others have an important role as organizers of meetings and seminars for local and international actors in the videogame industry, as is also the case of educational institutions in Colombia.

In Brazil, educational offer is wider than other countries in South America: universities offer master and doctorate programs in areas associated with videogames such as game design and videogame systems development, among others. Likewise, they focus on research and innovation development through game labs.

In Peru, universities have started offering specialization courses on videogames with emphasis on programming, and are academically oriented towards art, programming and creativity, as well as multidisciplinary diplomas for system engineers and artists, while also learning about videogame production and game design. Additionally, they offer research and serious videogame development as part of their multidisciplinary projects.

Although these South American experiences are important and show a point of departure for development, at a world level, the educational proposal is still incipient compared to different programs of specialization that have been established for a longer time and with a larger growth in the United States or Europe. According to the Princeton Ranking Review 2012, the top five programs to study videogame design in the United States of America and Canada are the University of Southern California, the Massachusetts Institute of Technology, the University of Utah, the DigiPen Institute of Technology and The Art Institute of Vancouver. All these institutions offer courses in programming and art, along with game design courses, practical application of this input to their final projects, and other complementing courses such as management and history of videogames.

Most countries in Latin America have a long tradition of making games (some of them have been creating videogames since the 80s). However, they have been focused on making advergames and serious games, and usually they haven't had an area of game design within the team. This has changed in recent years, where companies have been requiring more specialized professionals, in order to compete in the global market. But most of them have been self-taught.

Finally, along with the development of the specific knowledge of each area, it is necessary to develop some soft-skills, which are related to the emotional intelligence of each person. These should be taken under consideration within the curricula of universities, and that is a difficult task to accomplish. A study made in Chile indicated that we can identify four skills: a) good attitude towards change (knowing about the changes in the game industry); b) motivation towards goals (working with budgets and schedules); c) autodidact people (having professionals who are constantly learning), and d) game literacy (knowing about games and how to play them) [2].

Within the scope of the 2012 Global Game Jam, supported by the International Game Developers Association (IGDA), in which for 48 consecutive hours games are developed in a synchronized manner all over the world, we had the opportunity to conduct a research associated with the videogame industry. In the present paper we are hoping to describe the state of the main factors in the South American videogame industry in three different samples. The factors studied were the motivations, abilities, knowledge and needs that the participants of the South American Global Game Jams. We also wanted to provide guidelines about the role that universities should play to encourage the videogame industry in South America, as well as drive the decision-making process to create new majors and academic degrees associated with videogames, which would make the industry stronger. To achieve this goal, semi-structured interviews were done with southamerican experts in the videogame industry.

II. METHOD

A. Design

This is a descriptive research since it outlines the tendency of a group about a certain topic in a specific moment [8]. The study's approach is based on quantitative and qualitative variables.

B. Participants

The sample for this research stemmed from three study groups: the participants, the organizers and the experts of six South American countries: Venezuela, Colombia, Uruguay, Argentina, Brazil and Peru.

The first group sample consisted of 226 participants at the Game Jams organized in the aforementioned countries. An online questionnaire was sent out to participants and they volunteered to complete it. Most participants were men (91.2%) between 18 and 29 years of age (82.7%).

FIGURE I.

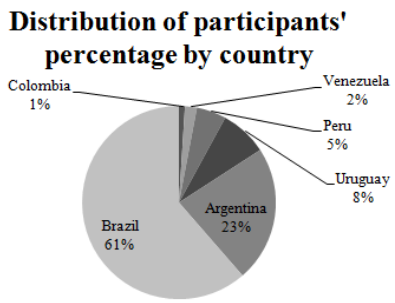

Figure I: Distribution of participants' percentage by country

A vast majority of the participants were developers (29.2%) or students (23.9%). Within the videogame industry, respondents were namely programmers (34.5%) or game designers (28.8%). Their main area of development was downloadable videogames (24.3%) or navigator games (18.6%) due to the market's demand and because they were videogame specialists in such platforms.

The second group of interest was integrated by thirteen organizers from various Game Jams in six countries. Questionnaires were sent out to organizers, which they volunteered to complete. 84.6% were men, while only 15.4% were women. Most of them were from Brazil (38.5%) and Argentina (30.8%).

The third group of study consisted of eight South American experts from the videogame industry. In this case, a purposive selection was made so that researchers could pinpoint such experts in advance. Most of them develop videogames for mobile phones in both Android and iOS operating systems, and have more than 10 years of experience in the field.

C. Instruments

Three instruments were prepared to gather relevant information, one for each study group. An online questionnaire was distributed among participants at the South American Game Jams with ten questions: four were open questions and six were closed questions. These questions were intended to explore the role of participants in the development of videogames, their access to them, the acquired and desirable abilities in the videogame development, and their opinion about the videogame industry in their respective countries.

As for the Game Jam organizers, an online survey was distributed with open questions inquiring about their interest in participating in the organization of such event, the impact of these games in their hometowns, their perception of the videogame industry, and the proficiency and skills that individuals working in such industry should possess. Finally, an interview guideline was prepared for videogame experts in South America.

III. RESULTS

Results will be presented according to the different variables that we were interested in measuring in the three samples. Some of them respond to just one of the samples, but others were evaluated in more than one.

A. Motivations

The study sought to enquire what led participants to be part of the development of a videogame at the Game Jams, what led organizers to dedicate their time to this activity, and what led experts to enter the videogame industry.

Participants at the South American Game Jams stated that their interest in videogame development was originated from the enjoyment of playing with them since they were kids. Such interest originated not only from playing videogames, but also from wondering how they were made, and it was this curiosity what led them to develop them. For example, one told us that: "Ever since I was five, I've played video games. I was a gamer when I was a teenager and then I studied Computer Science because I liked very much what I do." In the same way, another person talked about how he got into the videogame industry: "I've always liked them [videogames]. This is the reason why I did my bachelor's in Computer Science."

On the other hand, event organizers stated that the motivation for people to register voluntarily for the event and dedicate hours to this project is particularly associated with networking with others sharing an interest in videogames and being able to produce a videogame, as well as acquiring new knowledge from the synergy among participants. The following are the major reasons that may be reflecting their overall motivation to participate in videogame development:

> *"They want to show their games to the world."*
>
> *"They want to expose their names and their work, and meet new people."*
>
> *"Students want to have a portfolio full of games, so this will help them."*
>
> *"People that love games work in other industries (sectors), but they take their time to do what they like."*

It has also been observed that the majority of experts began their interest in videogames when they were kids. This interest led many of them to learn how to develop videogames in a self-taught fashion and to choose a college major closely related to technology, which in turn granted them with the possibility of going more in-depth in the videogame industry and start their own business:

> *"I've played games ever since I was a kid, then I became interested in doing a three-year course, and finally I chose Systems Engineering. I've kept my interest in games and have always played in my spare time."*
>
> *"Our interest in the industry results from a dream and from being able to work in what we are passionate about, that is videogames."*

B. Abilities

This research was intended to compare the level of the various abilities that participants at the South American Game Jams had with the level they wished to achieve. Levels were measured in a 1-10 scale, with 1 being the lowest level and 10 the highest. The following abilities were observed: proficiency of the English language, creativity, team work skills, group leadership skills, and project management.

Significant differences were found by comparing the acquired level with the desired level of all abilities ($p < 0.05$).

As shown in Figure II, the least acquired ability when developing videogames is creativity (*M* =4.47, *SD* =2.18), while domain of English Language and Project Management have the higher scores (*M* =8.44, *SD* =2.24; *M* =88.46, *SD* =1.08, respectively).

FIGURE II.

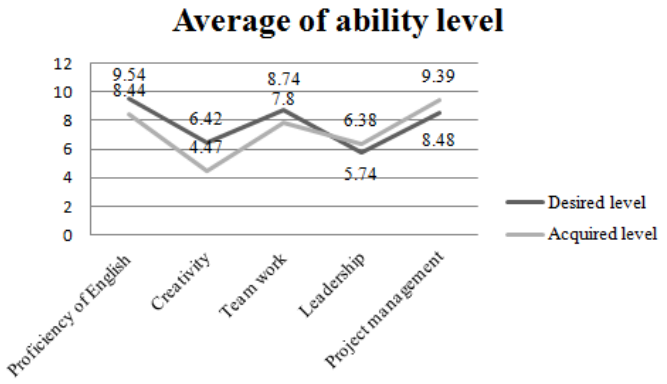

Figure II: Average of ability level

It can also be observed that in most cases participants wished to attain a higher ability level than the one they have, though it is interesting to note that their desired level in leadership (*M* =5.74, *SD* =2.01) is significantly lower than their acquired level (*M* =6.38, *SD* =1.83), (z =-3.152, p <.01). Similar results were found regarding the project management skill: the desired level (*M* =8.48, *SD* =2.01) is significantly lower than the acquired level (*M* =9.39, *SD* =1.01), (z =-4.57, p =.000, respectively).

There are no significant differences in the average score of acquired abilities by countries ($p > .05$); yet, there are differences in the desired level of creativity, X^2 (5, 117) = 11.87, p <.05, since participants from both Venezuela and Peru expressed their desire to improve this skill.

In addition, organizers were asked about those abilities required to work in the videogame industry (see Table I). Based on the results, it can be concluded that in order to succeed in this industry, individuals must have passion for the subject as well as eagerness and yearning to acquire new knowledge; also, team work skills and persistence skills are needed.

TABLE I.

Abilities required to work in the videogame industry, according to the experts	
Abilities	***Quantity***
Interest in videogames (motivation, love, passion)	10
Steady acquisition of knowledge, improvement, and ability for continuous learning	7
Teamwork	7
Discipline and persistence towards goal achievement	7
Ability to tolerate criticism, be self-critical and open to constant feedback	4
Flexibility and adaptation	4
Open and innovative mind	4
Communication skills	3

Finally, experts indicated that in the videogame industry it is necessary to have a diverse pool of professionals with different abilities; in other words, a multidisciplinary team is essential. Therefore, the industry requires steam-oriented people, with a self-critical mind, open to criticism and able to address problems. Additionally, they should be creative, flexible and hard-working.

C. Knowledge

In the same way, the level of acquired knowledge of South American Game Jam participants was analyzed along with their desired level. Such level was measured in a scale of 1 to 10, with 1 being the lowest level and 10 the highest. The analyzed skills were: knowledge about the videogame industry, know-how of design, know-how of programming, knowledge of production/management, and knowledge of the videogame production process. There were relevant differences when comparing the acquired level and the desired level of each skill ($p < .05$).

As shown in Figure III, participants' most desired and acquired skills were associated with videogame art design (*M* =9.57, *SD* =1.79) and production/management (*M* =9.23, *SD* =2.54). In addition, participants considered that programming is the skill they have developed the least out of those required to work in the videogames industry (*M* =4.48, *SD* =2.47).

FIGURE III.

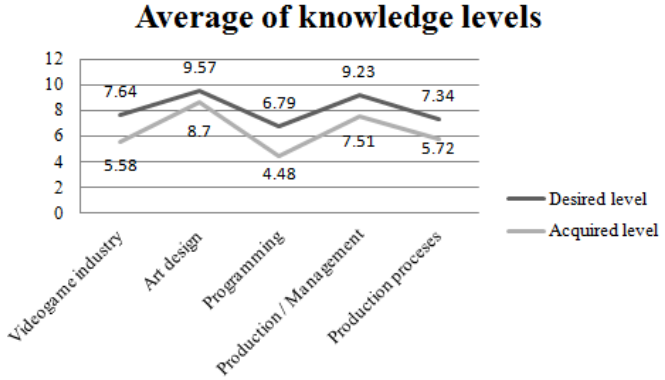

Figure III: Average of knowledge levels

Significant differences were also found when analyzing the results taking under consideration the country. On one hand, the acquired knowledge of production and management was significantly lower in Brazil (M =6.48, SD =2.78) compared to the other countries, X^2 (5, 117) = 15.00, p <.05.

On the other hand, Uruguayan Game Jam participants showed a significantly lower desire to acquire knowledge about the production process of videogames (M =5.64, SD =1.43), although they don't claim to be experts on the subject (M =5.55, SD =2.70).

D. Role to be played by universities to promote the videogame industry in South America

The majority of the South American Game Jam participants are hopeful about the videogame industry in their countries to grow and become more developed in the next ten years.

However, they also mentioned that this work requires investment in training, fighting piracy, revising the tax rates currently being collected (particularly in Brazil and Argentina) and above all, having universities take initiatives in this sector and offering more opportunities to those companies creating independent videogames.

The role of universities in the development of the videogame industry is very important, mainly because universities have the task of training professionals in this field by creating majors in videogame development, design and graphic design, which may not only focus on programming, but also be subject to a holistic understanding where students can learn a bit of everything about videogame development.

Participants also argued that a good first step would be to offer workshops and specialized courses on a core topic; for example, on how to create a good story or use a specific engine or, program of design or animation. One of the respondents stated that, "not only should there be majors offering courses on videogames, but also ongoing training courses on the latest industry [events]." Likewise, it was mentioned that "there should be opportunities for keeping up with the emerging technologies."

On the other hand, according to the Game Jams organizers, the training of videogame professionals in their countries should increase in the next ten years. They foresee countries offering specializations or programs to train videogame professionals, which would increase in number; therefore, there would be better trained personnel and the industry would grow.

Additionally, the conversation held with the sample of experts from different South American countries stresses the importance of the universities role on this issue. From the experts' perspective, the role that universities play, have played and should play has two paths. One is to train professionals with technical skills to create contents required by the market. It is necessary to train entrepreneurial abilities, just like they do in Brazil and Argentina, where many of the game production companies were originated on university campuses.

The second goal for universities should be research and development. These educational institutions should have incubators where new types of videogames would be experimented and their impact assessed. Consequently, the academia should support efforts in the innovation of videogames in areas beyond entertainment.

Experts share the organizers' perception that the number of courses to train professionals in this industry is insufficient. They stressed the urge to train Game Designers – people who are in charge of conceptualizing the game and its mechanics and outlining the necessary requirements for its development–, and professionals specialized in business administration for companies involved in technology development.

Moreover, it is recommended that universities include in their curricula videogame-related courses in many fields, like engineering, art, business, and so on. Currently, there is a high demand for qualified professionals, but low offer; this is mainly due to a lack of formal education in the field. The response by Brazilian experts is that in view of the low demand of skilled professionals, to encourage the launching of new companies coming out from the university campus appears as a good solution and one that has been put to practice in that country –where two out of three companies were created in the educational niche.

Finally, experts consider that universities should not only offer courses, but also *know and communicate the current state of the videogame industry*, and to that end it is necessary to organize conferences and meetings, as well as educational panels, and work in collaboration with other countries in the region.

IV. CONCLUSIONS

The videogame industry is growing all over the world and more experts in this field are required. In Latin America, educational institutions have begun to offer academic programs related to the design, programming, graphic design and production of games.

Although the testimonials of the different participants in the study showed that the use and enjoyment of videogames from childhood was a key factor that helped them on their motivation and interest for developing their own videogames, it is not sufficient to make a living out of this market. Making a game is a complex and sophisticated process [2] and it

requires more than one specific talent: it needs training and developing of hard and soft skills.

For example, the first professional videogames developed demanded a high investment due to the great amount of time and money spent training non specialized employers. Now, educational institutions should be responsible for preparing professionals for this industry, and it is important that they generate environments where students can acquire tools that can help them develop their own ideas.

Additionally, given the fact that there is not a massive offer of jobs in the videogame field, universities need to train professionals with an integrated and entrepreneurial approach. In other words, young professionals should not only know about programming, art or game design, but also about business management, and be capable to manage technological projects, leadership, communication and business. There is a high growth of the independent game development scene, where game studies publish on their own their games, directly on digital stores. Thus, educational institutions should also take this under consideration and provide their students with knowledge about how to run a small business.

South America is a region with big potential for videogame industry development. Currently, a high demand of videogames has been generated as a result of the huge growth of electronic trade and mobile devices connected to the Internet, which enables the consumption of casual games. On the other hand, top developing studies feel more attracted to invest in emerging markets as they can save development costs with local funds, and purchase studies aimed at the non-traditional sector. Also, some publishers are starting to open regional offices in Latin America in order to attract and work with local game studios, with the objective to bring Latin American stories to the players around the globe.

In spite of the possibility of growth of the videogame industry in South America, it is now considered as a poorly developed industry by developers and experts in the field. The major barriers hampering the videogame industry development are: the limited amount of firms in the sector, the government barriers (such as tax rates, fees, lack of investment), and the scarce number of professionals in this field.

Taken this under consideration, the participants of the study that are developers are very critic when they have to evaluate their skills and necessities. They do not feel that their level of creativity and programming are good enough and they need to be improved. In contrast, project management, team work and English are skills that developers think that are the most needed for working in the game industry, and participants believe they are good at them. It should be noted, however, that many of the participants of the South American game jams did not have much experience on working making videogames and knowledge about the industry, so these results should not be taken as wide spread symptoms, but rather, as how people interested in making games see the industry.

Experts on the videogame industry also mention the importance of self-learning, orientation towards goals, having an open mind and interest on videogames. It is also important to note that to develop these skills, videogame-related careers must be created since educational programs of three or four months are not enough. What is more, they propose, as well, the creation of game labs with research projects within the universities, where knowledge can be put into practice. This has been a common practice in universities and schools in the United States and Europe, where students are gathered around a common space where they have all the tools and have access to mentors with experience in the industry, in order to develop their own projects.

It is also important to note some questions that should be addressed in further researches about this subject. For example, “how can the relationship between academia and game companies be encouraged?”, “¿how can the curricula for game development courses be standardized?”, “which are the best tools and methods to teach game programming, game design and art for games?” And we think that there should be a similar research about the role of the government on the development of the videogame industry in Latin American countries, and the importance of digital cultural industries as a vehicle for economic development.

V. RECOMMENDATIONS

We would like to propose some ideas as guidelines that stem from the thoughts outlined in this study with the aim of encouraging educational institutions to make changes that may boost the videogame industry and support the overall technological development in the region.

- Develop training programs that can satisfy the needs of the videogame market and the interests of young people. These programs must have a comprehensive and multidisciplinary approach, interconnected with firms and institutions that may allow students to develop projects.

- Focus on increasing the standards on programming and enhancing creativity through workshops and design thinking courses among people from South America who are interested in working in the videogame industry.

- Offer courses in administration, production and videogame design, in addition to those in development and art included in their curricula.

- Create a game lab with the necessary tools for students to create their own videogames with the help of tutors and industry experts.

- Support towards technological or research and development centers specialized in advanced technology, particularly in the field of videogames. They should be centers for testing, research, creating ideas and technological updating linked to other universities and institutions that promote these areas. Thus, interdisciplinary projects, innovation, and entrepreneurship are encouraged.

- Create alliances with research centers at related companies in order to develop projects together and improve the professional training with practical experience at those institutions.

- Organize events, conferences and activities in order to inform students and the community of the latest updates in the industry.

- Approach the videogame development scene actively in their local area and break away preconceptions about the utilization of this technology in society as a negative tool.

ACKNOWLEDGMENTS

We want to thank the Global Game Jam Research Team for their support and contribution to this research helping us gather information. We thank Ricardo Guzman for his help building the technical report of this research. We also want to give a special acknowledgment to the South American experts in the South American videogame industry for their time and disposition during the interviews.

REFERENCES

[1] Schutte, W. (may 22nd, 2013). Newzoo Announces New Report: Global Games Market to Grow 6% to $70.4bn in 2013. Retrieved from http://www.newzoo.com/press-releases/newzoo-announces-new-report-and-projects-global-games-market-to-grow-6-to-70-4bn-in-2013/

[2] Gorigoitía, P. (2011). ¿Quieres hacer videojuegos? Formación professional y empleo en Chile. En Bertín, C., Bidart, S., Gorigoitía, P., Kierkegaard, S., Otero, E., Bidart., S.J., Cerda, G., Kierkegaard, P., Mendiburo, A., Umán, V., & Valencia, N., *Guerra y paz en el mundo virtual: Datos y debates sobre videojuegos* (pp. 29-40). Chile: Centro de Estudios Universitarios UNIACC.

[3] Digi-Capital.(2012). *Global Games Investment Review 2012.Q1 Transaction Update Executive Summary.2012, Digi-capital*.Retrieved from http://www.digi-capital.com/reports.htmlTakahashi, D. (2011, February 24).Latin American virtual goods business to hit $517M in 2012.*Venture Beat.* Source: http://venturebeat.com/2011/02/24/latin-american-virtual-goods-business-to-hit-517m-in-2012/

[4] Heng, S. (2009, August). A serious business with plenty to play for: The PC, console and mobile gaming sector. Munich Personal Repec Archive Paper, No. 16988. Retrieved from: http://mpra.ub.uni-muenchen.de/16988/

[5] Casual Games Association (CGA),(2012). *Casual Games Sector Report 2012*. Source: http://casualconnect.org/research-reports/

[6] Figueroa, A. (2003). *La sociedad Sigma: Una Teoría del Desarrollo Económico*. Lima, Fondo Editorial del Pontificia Universidad Católica del Perú; Fondo de Cultura Económica (FCE)

[7] Gamasutra. (2010). Analysis: Inside Brazil´s game ecosystem. Source: http://www.gamasutra.com/view/news/26645/Analysis_Inside_Brazils_Video_Game_Ecosystem.php

[8] Hernández, R., Fernández, C. & Baptista, M. (2010). *Metodología de la Investigación*. México D.F., México: Mc Graw Hill.