

# WhatsINFO: a Gamified Mobile Application Promoting the Integration of Computer Science School Freshmen to the UNLP

Isabel Miyuki Kimura, Matías Brown Barnetche, Claudia Queiruga, Javier Díaz

LINTI (Laboratory of Research in New Information Technologies), Computer Science School,  
National University of La Plata, 50 and 120 (Second Floor), La Plata (1900), Argentina  
{ikimura,mbrown}@linti.unlp.edu.ar, {claudiaq,javierd}@info.unlp.edu.ar

**Abstract.** This paper presents the issue facing university freshmen due to the complexity implied in acquiring new discourses, contents and habits of the institutional culture of which they aim at becoming a part. Online gaming and socializing through digital media are common among young people – they engage their interest and define new ways of expression and communication. Ubiquity is another requirement of the new generations, with smartphones being the most chosen mobile devices for communication and socialization.

In this context, we present the WhatsINFO mobile application, whose goal is to mitigate the divide existing between new students and university culture through a technological tool that is close to teenage culture. WhatsINFO is a gamified mobile application that accompanies and encourages communication and participation of National University of La Plata (UNLP) Computer Science School freshmen during their entry course. WhatsINFO was tested during the 2014 entry course of the Computer Science School of the UNLP with over a hundred students. This field test yielded encouraging results regarding its incorporation as a complementary device promoting a new learning space.

**Keywords:** University entry, digital natives, mobile devices, mobile application, Android, QR code, indoor positioning

## 1 Introduction

For students, entering university constitutes a complex stage that implies acquiring new discourses, contents and habits of the institutional cultura of which they aim at becoming a part (Walker V., 2012).

The passage between high school culture and university culture constitutes a series of transformations on the ways in which students traverse the academic and social world (Carli, S., 2007). Although these problems are normal and unavoidable, we notice that some students can solve this conflict and enter and remain in University, while others face conflictive situations that make it impossible to process and overcome this change.

Our current university students are “digital natives”<sup>1</sup>, they have different perceptions and experiences, have developed a different logic and carry with them new ways of

---

<sup>1</sup> The term “digital native” was coined in the year 2001 by the American autor Marc Prensky and

learning, reading, generating knowledge and doing work. Their vision of the world is traversed by the use of ICTs (Information and Communication Technologies). Taking into consideration the pedagogical potential of information resources coming from ICTs and the technological skills of our current students, it is fundamental to provide an educational use of technological resources in the academic environment.

Mobile telephony has had significant impact on the daily lives of young students, inserting itself deeply in their social practices as it allows them to interrelate multiple communication, socialization and entertaining activities. It is emergently being introduced in academic activities (Druetta D. et al, 2011).

The WhatsINFO application is a mobile application close to teenage culture that complements the activities that the Computer Science School of the UNLP coordinates with its freshmen in order to introduce them into its institutional culture. WhatsINFO is proposed as a technological complement to the activities done within the framework of the entry course of the Computer Science School, giving value to the social and cultural practices of teenagers. WhatsINFO was tested on a group of students of the Computer Science School during the 2014 entry course, yielding encouraging results regarding its incorporation during this first stage as university students.

This paper is organized as follows: first, it explains the problems involved in the university entry process and characterizes current freshmen, afterwards, it presents WhatsINFO, the gamified mobile application that accompanies and encourages communication and participation among Computer Science School freshmen and the activities engaged in with the students using this tool. Finally, we will make some final comments as a conclusion to this work.

## **2 Background**

### **2.1 Issues Concerning Entering University**

The passage between high school culture and university culture constitutes a critical stage for young students, as this process of separation, transition and incorporation into a new social and academic world makes many students experience anxiety and difficulties that can become obstacles for their entry into university (Medrano L et al, 2008).

From the moment in which students enroll in university, they start to undergo learning experiences and relate with teachers, peers and the institution itself, i.e., they begin to incorporate the new “rules of the game”.

In order to remain part of the institution, the university requires that students appropriate the institutional dynamics and a series of tools in a short period of time. Generally speaking, public universities are characteristic for their impersonal treatment of students, who are heterogeneous and “anonymous”. These characteristics are valued by students –however, they denounce a lack of guidance throughout their academic life. Unlike in high school, where there was a sense of belonging and security, in university students must learn to manage their time and make decisions on their academic path (Carli S., 2012). Many higher education institutions devise plans to contribute to the development of change processes involved in the initiation as a

---

refers to the dominating worldwide demographic group that describes the generational change in which people are defined by the technological culture with which they are familiar.

university student. In particular, the UNLP has implemented tutorship programs that configurate a pedagogical strategy that enables student entry and permanence in university, guiding freshmen in their insertion into university life (Castagno F. et al, 2013).

University receives increasingly more students accessing information through ICTs, while access to university contents is still ruled by the traditional way of the printed culture.

## **2.2 Digital natives and mobile devices**

Nowadays, ICTs are part of the social culture of the students entering university, of the way in which they bond and present themselves to the world. In general, these subjects arrive in university with digital literacy as a part of their daily lives, which makes them “digital natives”.

According to Piscitelli (Piscitelli A, 2006), the “digital natives” are characterized as wanting to receive information immediately, prone to multitasking, favoring graphics over text, being inclined to non-structured information, performing better when working online and preferring gamified education over traditional education.

They have an “innate quality” for developing practices through digital technology and an awareness of progress, which gives them immediate reward and satisfaction similar to what they would obtain from their favourite videogames.

Computers, videogame consoles, and smartphones are some of the devices necessary to thrive in any environment, as they use their devices for most of their daily activities, from obtaining information to communicating and providing information. It is important that activities proposed to freshmen are attractive to them as “digital natives” and allow for maximum involvement in relation to what they like.

A study conducted by UNICEF Argentina in October 2013 on “Access, Consumption and Behavior of Teenagers on the Internet” indicates that their main uses for the Web are to socialize, chat with friends and family (82%), followed by a similar percentage of activities such as online gaming (63%), searching for information (61%) and watching movies (59%). This survey also shows that, among the devices used by teenagers, cellphones have won over terrain in socialization through social networks, reaching high percentages (76%).

Mobility has come to be a requirement, both in the way we communicate as in the place where we socialize. Roxana Morduchowicz (Morduchowicz, R., 2013), coordinator of the program Medios y Escuela (Media and the School) of the Ministry of Education of the Nation, points out that the cellphone, due to its portable nature, is the device with which teenagers spend the most time during the day: “Not only does it go with them everywhere, for most of them it is on 24 hours a day. Half of teenagers never turn off their phone, and 30% turn it off to go to sleep”. According to the specialist, the cellphone is also a mark of identity: “it gives them a sense of belonging to a group and strengthens their social life, two dimensions that are fundamental to teenagers”.

Following these ideas, some universities such as Lewis University (USA), Queen's University (Canada), Amity University (India), Rider University (USA), Queensland University of Technology in Brisbane (Australia) have developed mobile applications to guide their students inside the campus, help them in administrative affairs, keep

them informed regarding activities and events, and aid in communications between students and teachers, among others (Google Play, 2014) (Fitz-Walter, Z., 2013).

### **2.3 Gamification and Learning Spaces**

It is important to integrate habitual practices of “digital natives” into the learning process so the learning environment is not isolated. Motivation and engagement are indispensable prerequisites for learning. In this sense, Prensky (Prensky M., 2014) proposes we “incorporate into the learning process goals and options that are interesting to the participants, immediate feedback and possibilities for growth, as this combination motivates and commits digital natives to their favorite games”.

The use of gaming elements to improve participation and commitment from people in non-ludic activities is called gamification. Recent developments in the field of ubiquitous and mobile computing technologies and daily use technologies, such as smartphones, allow us to locate gaming elements in most daily activities, enhanced by the use of contextual information provided by sensors within the devices.

For Mariana Maggio (Maggio, M, 2012), a specialist in educational technology, educational proposals must be generated that enable the acquisition significant and long-lasting learning from the acknowledgement of the realities of students and the framework of technological development and knowledge generation in the field to which the teacher belongs.

Today, we must fix our eyes on the students’ particularities and complexities if we want to increase their inclusion in the university environment. This approach values social histories and previous experiences brought along by the students (Saccone, J., 2013).

Juan Domingo Farnós makes reference to ubiquitous learning as a way to establish relations between education and work: “learning can take place anywhere, but we must value it, i.e., if learning takes place outside the classroom, what is learned has to have as much value as curricular content –not only that, it has to have more value than curricular content for being learning that attends to what each student wants to learn”.

### **2.4 Entry to the Computer Science School of the UNLP**

The Computer Science School of the UNLP has a direct entry system with the additional exigence of an entry course with mandatory attendance and a non-eliminatory diagnostic test. During the entry course, students must attend three disciplinary modules: “Expresión de Problemas y Algoritmos” (“Expressing Problems and Algorithms”), “Concepto de Organización de Computadoras” (“Computer Organization Concepts”) and “Matemática 0” (“Mathematics 0”), and the “Taller de Inserción a la Vida Universitaria (TIVU)” (“Workshop for Insertion into University Life”). This workshop was introduced in 2012 in the activities of the entry course and its goal is to support, guide and promote the integration of freshmen with knowledge that will allow them to lead their academic lives the best possible way.

At the Computer Science School, the development of the tutorial activity was linked to the implementation of the national PACENI program (Proyecto de Apoyo para el Mejoramiento de la Enseñanza en Primer Año de Carreras de Grado de Ciencias Exactas y Naturales, Ciencias Económicas e Informática – Support Project for the Improvement of Teaching in the First Year of Computer, Exact, Natural and Economic

Sciences Degree Courses) promoted by the Ministry of Education of the Nation in the year 2009. Peer tutors, who are advanced students of the multiple degree courses of the Computer Science School, support the new students in their transit through academic life. This guidance is a means that enables the creation of social bonds and university affiliation within the institution (Díaz, J., 2013).

### **3 WhatsINFO**

WhatsINFO is a project whose goal is to provide another means to mitigate the existing divide between new university students and university culture, through a technological tool. Although many universities in Argentina have guidance strategies for the first years of the courses, such as the tutorship system, no technological developments exist to complement them. WhatsINFO is proposed as a technological complement to activities undergone in the framework of the entry course to the Computer Science School of the UNLP, giving value to cultural and social practices among teenagers.

WhatsINFO is a mobile application whose distinctive characteristics are gamification and socialization. This references both the use of game elements in the application and the formation of a social network around the group of Computer Science freshmen. Using gaming mechanisms and enabling socialization through digital means gives value to the innate skills and knowledge freshmen bring with them.

The main feature of WhatsINFO is the set of challenges presented to the users that encourage competition. It seeks to motivate students by means of gaming mechanisms and socialization. These challenges provide information relevant to the students and encourage learning of the institutional culture. By successfully completing the challenges, users obtain points that will accumulate and allow them to compete in a ranking with other WhatsINFO users.

WhatsINFO challenges students to answer multiple choice questions on topics of their interest, connect with friends in increasing amounts (5 friends, 10 friends, 15 friends), visit facilities such as the Students Department, the library, the canteen, or the students union, attend events and activities in the framework of the entry course and get to know the tutors. By getting students to be informed regarding events of their interest, tour the premises and socialize with their peers, WhatsINFO introduces them slowly into the institutional structure of the School.

#### **3.1 What Information do Freshmen Need**

The development of WhatsINFO began in 2013 and the goal set was a pilot test during the 2014 entry course. During the first development stage research was performed on the most common difficulties and questions among freshmen. For this task, during December 2013 and February 2014, a series of interviews were conducted with the people in charge of the institutional areas of the Computer Science School that have contact with the freshmen: Entry Department, Teaching Department, Accessibility Department, Pedagogical Department, Library, Student Affairs Sub-Secretary and Student Union.

The information gathered allowed for the detection of the most frequent problems dealt with by freshmen, the matters most consulted in each area and the information these areas consider fundamental for these students. The most frequently asked

questions are related to exam, enrollment and class dates, use of institutional systems (SIU-Guaraní, Moodle, webUNLP), spaces that hold information on the subjects, their timetables, evaluations, services offered by the School and the UNLP to its students, how to find specific places in the School and everyday entry course matters such as how to: pass subjects, justify absences, contact coordinators, locate classrooms, etc. Based on these questions, all the areas considered that WhatsINFO could become a centralized medium to collaborate in spreading this information. The most commonly used means of institutional communication are the School website, Facebook, Twitter, the School bulletin boards and to a lesser extent email and telephone.

This information was the basis for the elaboration of activities, setting of challenges and news dissemination through WhatsINFO.

### **3.2 WhatsINFO Architecture**

WhatsINFO has a client-server architecture comprised of an Android mobile client application and a content management server.

One of the features of a client-server architecture is centralized resources due to the server being at the center of the application, able to manage the resources common to all users. The choice of architecture for implementation was influenced by the need to have challenges, events and news load dynamically and to share the ranking and have feedback on the challenges overcome by the users.

The WhatsINFO client only consumes information and it is the server that handles all the processing and content management. When an important event takes place, the server generates an alert that the client consumes and shows the user in the form of a notification in the status bar.

Communications between both applications take place through a REST architecture on a secure connection using a combination of the TLS and HMAC security protocols. This communication is structured by means of a REST API with JSON format. As an indoor positioning method we used a type of symbolic location by means of QR codes.

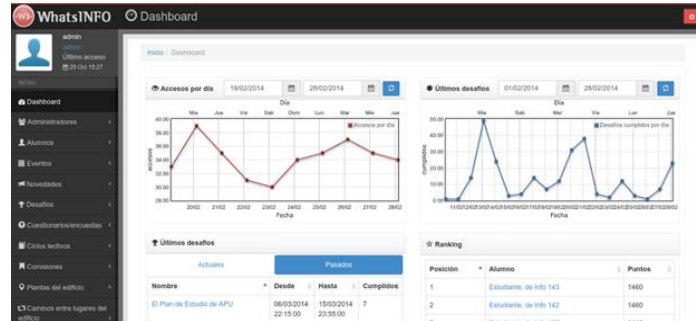
WhatsINFO was developed with open source code tools and technologies and freeware ones in some specific cases –all of them are broadly used in software development.

#### **Content Management Server Application**

This web application was written in PHP using the Symfony 1.4 development framework with a MySQL data base server and HTML5 and CSS 3 for the graphic interface.

This centralized server is used to feed the mobile client application. It helps create and manage user accounts, events, challenges, news, questionnaires and surveys for users to access. Only the content administrator user can access this application.

Fig. 1 shows the statistic screen of the WhatsINFO server application.



**Fig. 1.** Screen capture of the statistics of the content management Server Application

### The Mobile Client Application

As stated in Queiruga et al. (Queiruga, C., 2013) “Mobile phones have more and more features, bigger and more precise screens, incorporated cameras for pictures and video, they play music and come with multiple sensors, and they have the capability to be always on. This is a challenge to the development of new applications that stop being isolated entities exchanging information through a user interface. The development of innovative applications that allow for the integration of multiple technologies involving mobile devices is a very motivating and current topic for young university students”. For a mobile application to be attractive and usable, not only does it have to adapt to a “more reduced” medium, but its presentation must be implemented in a new and creative way.

The Android platform was chosen for the development of the WhatsINFO mobile client application because it is an initiative that is close to freedom in mobile applications and it promotes an ethics controlled by the software user. Moreover, Android is currently the most popular platform, present in over 75% of mobile devices in Argentina (StatCounter Global Stats). Additionally, because Android promotes openness, it makes it possible to create applications free of charge and the developer has the support of a very active community of developers with very complete and up-to-date documentation through the official Android developers website (<http://developer.android.com/>).

The WhatsINFO mobile client allows students to access information on events, news, friends, user profile, WhatsINFO ranking, school maps and challenges, which can be done communicating with the content management server through the Internet.

Fig. 2 shows the list of challenges on the left of the screen and the WhatsINFO ranking on the right.

The Android client application was developed following interaction patterns and design standards present in the currently most popular applications. Its main goal is to provide a good experience to students by means of a friendly and easy-to-use application.

## 4 The WhatsINFO Experience

In order to evaluate the use of WhatsINFO with real freshmen, a pilot test was performed with a small number of students from the 2014 entry course that expressed



**Fig. 2.** Screen capture of the list of challenges (left) and the WhatsINFO ranking (right)

interest in participating in the WhatsINFO trial. For this purpose and with the goal of examining the practices in relation to ICT and mobile application use among Computer Science School freshmen, during the 2014 enrollment process, a survey was conducted on applicants to different courses in the School. This survey focused on how many of them have a mobile device (cellphone or tablet) with the Android operating system and whether they would be willing to participate in the experience of using WhatsINFO.

228 surveys were answered, out of which 132 applicants to the 2014 academic year answered they had a mobile device with the Android operating system and they wanted to participate in the WhatsINFO experience.

The WhatsINFO management application was installed in a server provided by the LINTI of the Computer Science School.

WhatsINFO was published in the official Google application store for Android, Google Play, so the applicants could download the application and install it in their cellphones or tablets.

In order to orient the students in the premises of the Computer Science School, QR codes were placed in each classroom and areas frequented by students (20 signs in total) with the goal of allowing them to complete the challenges and enabling them to locate themselves in the facilities.

During the WhatsINFO experience, 183 user accounts, 14 events, 57 news and 36 challenges were created. The frequency with which the students were posed challenges was an average of 5 every week. Out of the 183 users, 94 accessed the application and 58 completed at least one challenge.

The application displayed the daily canteen menu, information on scholarships, means of transport, university diner, and important dates and schedules.

When the entry course was finished, a meeting was organized with the Computer Science School freshmen that used WhatsINFO to hear their opinion about the application. Some awards were given and the attendants participated in further surveys and interviews with the goal of obtaining information to evaluate the experience.

## 5 Results of the experience

The WhatsINFO pilot test included approximately 30% of the 2014 applicants to the Computer Science School degree courses. The test took place in February and March



and evaluated the applicability of a technological tool close to teenage culture and aimed at guiding new students in their transition from high school to university.

The analysis of the result was performed taking into account: Google Play score, active users registered in the application, the activity of the users, surveys and interviews conducted once the course was over and problems detected during the pilot test.

The statistics provided by Google Play Store showed that over 150 students downloaded and installed the application and rated it very positively, with an average of 4.93 over 5.

The experience took place within a period of two months during which almost a hundred students used the application and solved over thirty challenges. Compared to the amount of user accounts created, the average application use was 50%. It is considered that this shelling was due to problems with some versions of Android, with the WiFi networks of the School and with a lack of use of email accounts by the students, as they were the main initial means of communication with WhatsINFO users.

The maximum score students could obtain by completing all the challenges was 1500. Two students obtained 1460 points, which is 97% of the total.

It is worth noting that 104 friendships were registered in WhatsINFO, and 20 users completed the challenge "Make friends" (it required the user make at least 5 friends).

The surveys conducted through WhatsINFO and the personal interviews at the end of the experience yielded encouraging comments on the design and usability of the application. Freshmen gave a positive rating to the real time notification system and showed considerable interest in challenges, considering that WhatsINFO "sets itself apart from the seriousness and motivates you" and "provides interesting information and fun by means of the challenges". Some of the suggestions included: incorporating communications like the ones in Facebook or WhatsApp, including information regarding first year subjects and making WhatsINFO available to other mobile platforms.

## **6 Conclusions**

Given the complexity of the transition between high school and university and giving value to the characteristics of digital natives, among which are the freshmen of the Computer Science School of the UNLP, WhatsINFO was built and implemented as a gamified mobile tool to guide them and promote their communication and participation during the Computer Science School entry process.

It is worth noting that this experience constituted an innovative strategy that encouraged students to become involved in the institutional culture through a daily technological medium. This evidences that the use of technology can contribute to solving social problems by becoming a modern complement to traditional practices.

We were able to prove the innate capacity of freshmen in relation to the use of mobile applications and their digital ability to adapt to new applications, not needing specific training or directions to meet the challenges posed by WhatsINFO, befriend the medium, edit the profile information and discover the multiple functionalities.

WhatsINFO fosters the preferences and expectations of freshmen that choose real time communication means such as chats and social networks and value socialization through digital media.

## References

- Carli, S. (2007): "La experiencia universitaria contemporánea. Transmisión y sociabilidad". Conferencia organizada por el Programa de Evaluación, Acreditación e Innovación, Subsecretaría de Grado de la Secretaría de Asuntos Académicos de la Universidad Nacional de Córdoba, Córdoba, Argentina.
- Carli, S. (2012): "El estudiante universitario. Hacia una historia del presente de la educación pública". First edition. Serie Educación y Sociedad. Siglo XXI. ISBN 978-987-629-239-9 .
- Castagno, F., Ferrer, M., Piretro, A., & Rodríguez, C. (2013): "Ingresantes y entornos virtuales en la formación de comunicadores sociales: acerca de lazos y enlaces". V Encuentro Nacional y II Latinoamericano de Ingreso Universitario, August 2013, Universidad Nacional de Luján. (2013)
- Díaz, J., Queiruga, C., Ungaro, A., Vilches Antao, D., Felipe, C., Gómez, S., Kimura, I (2013): "Tutoring as an Inclusion Strategy. The UNLP Computer Science School Case - Facultad de Informática - Universidad Nacional de La Plata". Conferencia Latinoamericana en Informática 2013 (CLEI), Naiguatá, Vargas, Venezuela.
- Druetta, D., Garay Cruz, L., López González, R., Portillo Sánchez, M. (2011): "Uso y apropiación de la telefonía móvil. Opiniones de jóvenes universitarios de la UNAM, la UACM y la UPN". Derecho a Comunicar Magazine. Issue No. 3. Asociación Mexicana de Derecho a la Información A. C. ISSN: 2007-137X
- Fitz-Walter, Z., Tjondronegoro, D. & Wyeth, P. (2012): "A Gamified Mobile Application for Engaging New Students at University Orientation". OzCHI '12 Proceedings of the 24th Australian Computer-Human Interaction Conference. ACM New York, NY, USA. ISBN: 978-1-4503-1438-1.
- Google Play (2014): Google Play Store. Available at: <https://play.google.com/store>.
- Maggio, M. (2012): "Enriquecer la Enseñanza". Paidós. ISBN: 950-12-1535-9.
- Medrano, L., Olaz, F (2008): "Autoeficacia Social en Ingresantes Universitarios: su relación con el Rendimiento y la Deserción Académica". Revista de Psicología General y Aplicada: Revista de la Federación Española de Asociaciones de Psicología, Volume No. 61, Issue No. 4, pp. 369-384. ISSN: 0373-2002.
- Morduchowicz, R. (2013): "Los adolescentes del siglo XXI, los consumos culturales en un mundo de pantallas". Fondo de Cultura Económica. ISBN: 9789505579624
- Piscitelli, A. (2006): "Nativos e inmigrantes digitales: ¿Brecha generacional, brecha cognitiva o las dos juntas o más aún?". Revista Mexicana de Educación Educativa, Volume No. XI, Issue No. 28. ISSN: 1405-6666.
- Prensky, M. (2014): "The World Needs a New Curriculum". The Global Future Education Foundation and Institute, Ltd. ISBN-10: 0578144239
- Queiruga, C.; Banchoff Tzancoff, C.; López, F. (2013): "RemoteBot: una Aplicación que Combina Robots y Dispositivos Móviles". XV Workshop de Investigadores en Ciencias de la Computación (WICC 2013). Paraná, Entre Ríos, Argentina.
- Saccone, J., Pacifico, A., Cáneva, C. y Fierro, M. (2013): "Análisis del acceso a la UNL, los dispositivos político-académicos y la normativa institucional como herramienta para la igualdad de oportunidades". V Encuentro Nacional y II Latinoamericano sobre Ingreso a la Universidad Pública "Políticas y estrategias para la inclusión. Nuevas complejidades; nuevas respuestas". Available at: <http://goo.gl/qrOScs>. [Last access: August 2015]
- StatCounter Global Stats (2015). "Top 8 Mobile & Tablet Operating Systems in Argentina from Jul 2013 to Jul 2015". [http://gs.statcounter.com/#mobile\\_os-AR-monthly-201407-201507](http://gs.statcounter.com/#mobile_os-AR-monthly-201407-201507).
- UNLP (2010): "Plan Estratégico de la Universidad Nacional de La Plata". Available at: [http://www.unlp.edu.ar/uploads/docs/estrategia\\_1\\_\\_\\_ensenanza\\_pe\\_2010\\_2014.pdf](http://www.unlp.edu.ar/uploads/docs/estrategia_1___ensenanza_pe_2010_2014.pdf)
- Walker, V. (2012): "El tránsito de los estudiantes por la universidad". Editado por la Fundación Universitaria Andaluza Inca Garcilaso para eumed.net. ISBN: 978-84-15547-99-0. Available at: <http://www.eumed.net/libros-gratis/ciencia/2012/10/index.htm>