E-Learning "Java Programming" on Facebook!!! Big Ambitions and Important Challenges

Laid Kahloul, Samir Bourekkache, Okba Kazar
LINFI Laboratory, Computer Science Department, Biskra University, Algeria

Abstract: *The objective of this paper is to present an experience of virtual class on Facebook. Authors have started this project months ago. This virtual group is named: "programming with java" (in French: "Programmer avec Java", accessible at the address: https://www.facebook.com/groups/232171016900671/). The group was principally dedicated to 2nd year computer science's students at Biskra University (2011-2012 scholar years) (www.univ-biskra.dz). The growth of the group attracted more students in other levels, and many teachers get involved in the animation of the virtual class. In the following sections, authors will discuss the chronological events: creation and first results, recent results and evolutions, and encountered limits of virtual class as Facebook groups.*

1. Introduction

Nowadays, the learning process meets many problems: (i) The big volume of information that the student must apprehend in his formation, (ii) the dynamicity of this information and their continuous evolution, and (iii) the unavailability of the student and the teacher some times. However, the big development in telecommunication technologies allows the propositions of new and creative solutions, as e-learning (electronic learning) [12, 1]. The e-learning brings, principally, two ideas: (1) no obligation of the presence of teachers and students in the same time and in the same location, (2) a liberty in the learning process in the contents as well as in the learning methods. E-learning is, basically, made on the internet. It requires the implementation of some plat-forms that facilitate the learning process. Many plat-forms are proposed in the literature WizIQ [15], AdobConnect 8 [16], K-12 classroom [3], Florida Virtual School [17], Docebo [18], Ojidoo [19], ... Some of these platforms belong to universities, some platforms can be also closed (thus, dedicated to a specific category of members) or free and each one can be subscribed. The learning in these platforms can be official and offers certificates to their members, or it can be unofficial and its objective is enhancing subscribers' knowledge.

The growing of the Internet and the evolution of the number of users in Arab countries bring to front the use of the net as a successful tool in learning process. Some sites like facebook [20], twitter [21] … and many other sites, classified as social networks, attract huge numbers of subscribers. According to some statistics in 2012 [22]: Egypt counts more than 7 million subscribers in social networks web applications, in Tunisia, there are 2,5 million members, and in Algeria, 2,1 million members are present only on Facebook. In Algeria and only in four months, Facebook gained 600 000 new subscribers. These statistics prove that Facebook becomes one of the biggest social networks in the world. Its impact on the evolution of peoples and on their lives is so clear in these last years. Many revolutions, in what is called now "Arab Spring", are due to this social network, with the developed interactions that it creates between subscribers. Hence, the spread of this kind of social networks must attract the interest of pedagogues and educators who are interested in e-learning. As an example, in our department, the majority of students are subscribed on Facebook and many teachers have Facebook accounts as well. The idea to use Facebook, for learning, presents both an important innovation and a challenge for learners.

The objective of this paper is to present the idea of e-learning using the Facebook as a basic platform. More precisely, authors talk about the experience of creating a virtual class as a Facebook group. The class is free and open and anyone can subscribe in it. Initially, the idea was originally dedicated to the second year students, to reinforce their learning of programming languages. The first class was specialized to learn Java programming language. Some voluntary teachers proposed short courses, exercises, and mini-projects. The subscribed students (Facebook users) learn and follow the activities of the virtual class, from their homes. They interact in the class by following courses and comments, asking questions, answering exercises, and taking tasks in mini-projects. All these activities must be published on the wall of the created class. The

class wall gives the opportunity to check the history of all the activities done at the virtual class. The idea is so innovative and meets some success.

This paper presents an extension for a previous short paper [9], in which authors have summarized the idea. The present paper offers more details and discusses the latest results in the group. The paper is organized as follows: the section two and three present the origin of the idea, peoples and situations that have inspired authors to start the project. Section four presents the start on of the class, and its evolution. Section five shows the latest obtained results. Section six details some problems that authors meet in this project. Section seven presents some related works. Finally, section eight concludes this paper.

2. The Idea of the Group

At the computer science department in Biskra University, students take programming in their first two years. In the first year, students study algorithmic in a general way. In this unit, students have one course, one tutorial class (TD), and one practical class/labs (TP) per week. They use the C language [10] to program on machines. In their second year, students have three units, related to programming: algorithmic in first semester where students learn data structures, and they use the Pascal programming language [14] to program their assignments. They work on a LINUX architecture [23], where they study the programming on a pseudo-distributed system. The second semester allows the students to study two others units related to programming: the algorithmic unit where students study how to compare between two programming languages: Pascal and C, and the software engineering unit which allows students to start some Oriented Object programming principals. The object oriented principals are given in a course as a conceptual approach, and in a class work as a programming paradigm. In the software engineering unit, and in its practical work, the students use the C++ language [8] to write their solutions, but there are no practical works on machines. This lack in the program is not the major reason of the low level in programming of students. Even, students take programming with C++ in their first and second years, and they have done many practical works during the two years, many of them meet problems in programming. Henceforth, authors thought to reinforce student knowledge in programming by creating virtual class on Facebook.

So, the first objective of the virtual class for programming is to enhance the students' level through motivating them by the presence with them virtually on Facebook, by an on-line or off-line assistance, and by establishing a permanent links with them.

3. Motivation for Creating Java and Eclipse Group

The choice of teaching Java is due to many reasons. Java is a natural extension of the C++ language. Students who study C and C++ will find that java is an ordinary evolution of their idea on C++. Java is a real object oriented programming, and so can be seen as an adequate case study for students that are following a course on software engineering and Object Oriented Programming, this is the case of students in 2nd year. In lasts years, Java became the most used language and it can be found on many devices. Its JVM (Java Virtual Machine) allows their programs to be executed on lot of platforms with few configurations. So, learning the Java language will open lot of perspectives for students and allows them to have in their formation a real tool that can help them in their professional life.

In addition to the above reasons, authors got a personal motivation of this work due to some students that authors have supervised in their "project". The project was to implement an embedded application on smart card. The platform that they have used is the Java-Card [24], which are a set of plug-ins[1] that can be added to the Eclipse Environment, and it allows developers to create applications dedicated to smart card. The students meet real problems to study this language. Many days they were lost to understand how to configure the Eclipse environment, and how to program with java. These situations motivate authors to try to enhance students' level in this language and generally in oriented object programming.

4. Start On and Evolution of the Group

4.1. First Step: Creation of the Group

The group was created in June 2012. One of the authors (supervisors) has created it on his own Facebook page. Firstly, authors have put a description of the group and the reason of its creation. In the second step, authors have put on the wall of the group three objects: The Eclipse environment [25], the JRE (Java Run Time) environment [26], and two references: A big book: "Développons en Java avec Eclipse" [5] and a short course "java for dummies" in French ("Java pour les nuls") [4]. Firstly, one student, from the second year, was invited to the group. So in its first day, the group was created with two members (this student and one of the authors), and some material, which authors consider important as initiation. In its first days, supervisors have not done in publicity to the group in the department, never with their colleagues or their students. Supervisors want to allow students to discover the group with their voluntaries. They expect that the

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[1] Plug-ins : a set of software components that adds specific abilities to a larger software application

propagation of the news in Facebook must bring some other students. And really, it was the case, and the situation after few days was more than any expectation. The group was created on June 12 that 15:52 with two members. This number grew to 68 members in two days only: June 14th at 20:42.

The growing continues and the group counts 206 members in July 9th 2012. This is Facebook, where information is spread swiftly. Currently (December 30th 2012), the group contains 381 members.

The first step in the learning process was to invite all the members in the group to install the JRE (the Java run time environment), then to unzip the Eclipse environment and to launch the environment. All members were solicited to publish a snapshot of their screen on the group's wall. Some results were speedily published, which were encouraging. Some members had not the ability to download these tools never to configure them. Supervisors proposed to members that meet downloading problems to take copies directly from department office. There were not a lot of members who came to the office. And they tried always to download their own copies from the net !!!. Students prefer to prove their ability to use the net. After some publications on the wall, supervisors have seen that it is time to go on. They have put on the wall a first program example, and then they asked to all the members that have correctly launch the Eclipse, to realize this first code, and of course to publish their results or their problems on the wall of the group. The example is so easy, and is one of the first examples that one can find in all Java tutorials.

```
Code java:
publicclass class1 {
    publicstaticvoid main(String[] args){
    System.out.println("Hello");}
                        }
```

The results were always encouraging, and in few days all members that have Eclipse start to publish their results (Figure 1) or problems that they met in programming this simple code.
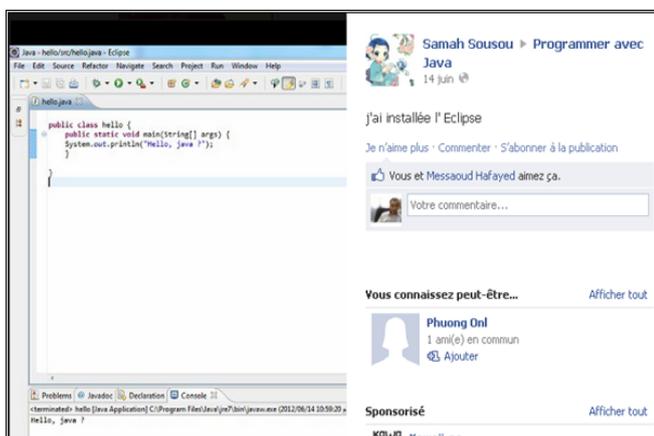

Figure1. The first publication of an execution by a member.

In this step, some teachers rejoin the group, they appreciate the idea, and they start to take part. Many students put their snapshots on the wall, and ask about their problems. Some other members propose solutions. Teachers come also to give explanations, and propose remediation of the problems. Members that met problems, republish other snapshots that prove the corrections or present other problems. The learning process is done online some time, when members, teachers are all present. Sometimes also, learning is done offline and every members put comments. In few days, all members that have launched Eclipse have their code well executed. It was time to go toward another level. In few days, the group has reached the portion of 14/134 members (in June 21) that have published their snapshots, where they present correct execution of the above code. At the moment when this section is written, more than 20 members have launched their first code in java.

4.2. Second Step

Former results were really encouraging. A portion of members, even small (20/134), demonstrates a big motivation and shows an important ability to learn and to enhance their knowledge in programming with java. Their presence starts to be objective and the learning process starts to be so important. Supervisors feel a responsibility towards these motivated members. One teacher, in the group, starts to present practice works. He published three practice works as exercises (at June 22). These practice works can be seen as initiations with java programming. Members try to resolve this works, publish their problems and finally correct their programs and publish results. Figure 2 shows the first publication with a correct result for the third practice work (computing the π value). Members who did the 3rd work had done the two others.
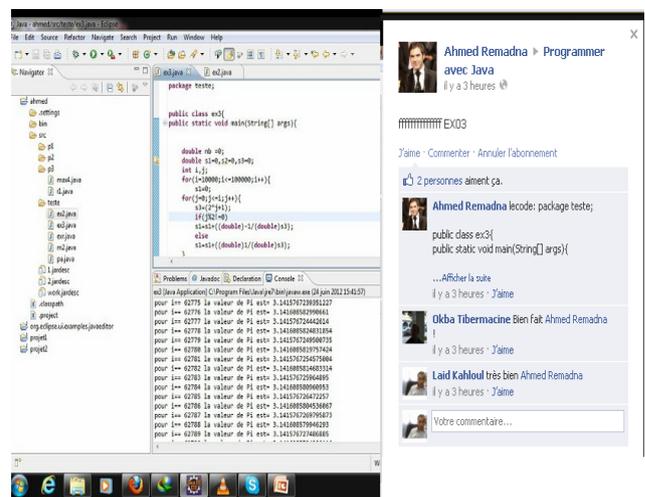

Figure 2. The first publication of the solution for practice work 3.

During the redaction of this paper, more than 20 members have done the three exercises. This number stills to be far from the subscribed number which is

381 subscribers (in December/30/2012).

4.3. The Next Level

When supervisors have seen these results, even small with respect to the big number of subscribers, they have decided to go more and to think to work on two levels: (1) motivate the other subscribers to rejoin those who have realized the proposed practice works, (2) propose some idea to continue with those who have realized some advances in programming.

The idea that supervisors have adopted is to work in sub-groups (or teams). Some Java mini-projects are proposed. These mini-projects require, for example, three or four members, to be realized. So, supervisors propose to prepare at least three teams, so 12 to 15 members are required. These members must, firstly, prove their ability and their motivation by publishing the three solutions of the three practice works. Each team will be supervised by a teacher and the members of each team will work together. These teams will work as groups of programmers in software engineering. Each team will receive the description of a project from their supervisor, they will choose one chief, they will develop a small design and they start to divide this design to many separate codes (classes for example). Each programmer will program his part in the project, discuss with his team and, of course, will publish his results.

To motivate these set of teams, authors propose to make the programming activity as a big game where teams will conquer to get some championship. These teams are called using some famous names of football teams. The most of programmers in the virtual class are admirers of football and Europe leagues. This idea can attract more programmers and motivate them. These kinds of ideas can make big concurrence in the class and, so, bring more results.

Before getting the teams ready, the class must be active and must attract more members. The professors in the class propose sometimes small exercises. One of the supervisors (an engineer in CdP Technique/PLM Consultant, Paris) [27] proposes some guidelines to respect when programming java. He proposes sometimes small exercises where the members try, for example, to check out errors in some Java codes. The objective is to keep the group alive.

Five mini-projects were defined: developing a data base system to extract data for many tables, developing an information geographic system, developing a check game simulator, developing a drink distributor simulator, and finally developing a minesweeper game simulator, so five teams are composed. During the redaction of this section, 20 programmers have rejoined these teams under their choices. These programmers have proved their motivation. The advances realized in these teams are really encouraging for the voluntary teachers and for the other members. Some new members ask for

being in these teams, but supervisors still requiring that any new member must achieve firstly some practice works in the class to be in one of these teams.

The virtual class has inspired some of the teachers to create their own web pages to describe the mini-project that they have proposed in the class. The best example is the beautiful web site created by Mr A. Azziez (http://ahmed.aziez.org/programmer-avec-java/dbexport). In this site, the well definition of the mini-project can be found. The site is an incremental site, so it will be enriched by the work of the students included in this team.

5. The Latest Results

In this section, authors will present some of the new results which are considered as an encouraging. The main events that authors were waiting in these last three months are the developments of mini-projects.

Four months ago, the teams began the achievement of the tasks given by the teachers (supervisors). During these months, some results are received which were modest; however, one should highlight the ambitious work done by the students of the fourth team. This team arrived to finish the mini-project entitled « Minesweeper » with very acceptable results. The members of the team simulated the game of the Minesweeper of the WINDOWS 7. The following figures (Figure 3 (https://www.facebook.com/photo.php?fbid=487812081247268&set=o.232171016900671&type=3), Figure 4 (https://www.facebook.com/photo.php?fbid=487815251246951&set=o.232171016900671&type=3)) show the results of the mini-project.

Figure 3. First result about the proposed project.

The same team realized another game; the member put his snapshot about the game suduko and a link to download this game. These results give the possibilities that social networks offer to create a learning effective environment.
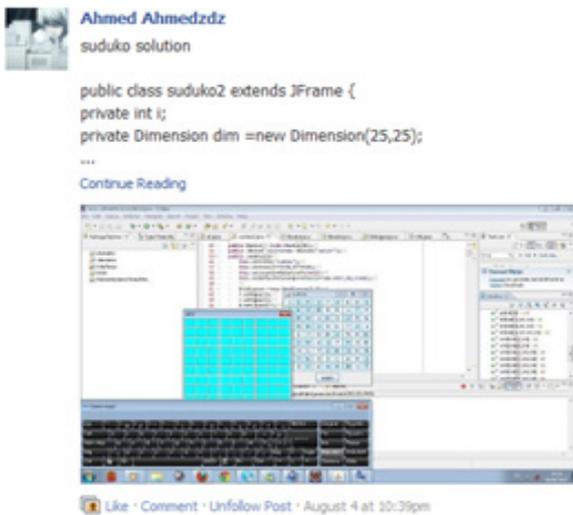
Figure 4. Another result by the same team.

Another team has published a result about the simulator of the drink distributor. Figure 5 (https://www.facebook.com/photo.php?fbid=425586624167996&set=o.232171016900671&type=3&permPage=1) shows tis result.

Figure 5. Another result obtained by another team.

The weak results of the rest of the teams can be explained to the summer holiday which is a big break to the learning process. Supervisors expect that the beginning of this new university year will bring new results to prove that our idea will become true.

6. Problems and Limits in the Class

Many problems have been discovered during the creation of the class, its evolution, and the learning process. Some problems are due to the nature of this social network (Facebook), some problems due to the organization of the learning process, and finally some other problems are due to members themselves. The most important problems, investigated in this innovative experience, are presented below.

The Facebook, as a social network, is not dedicated really to create a class for learning about some subject, and exactly some complicated task like programming. Facebook is based on the idea of developing complex and open relations between persons. This is the power advantage that can help the spreading of the idea. But the philosophy of Facebook is so easy, and information that can be found by subscribers is some comments, some photos, videos or files. The problem is that all these kind of data can be published on a wall as events. As real walls, the Facebook wall could not show more than few events. The learning process uses the wall of the created group (the virtual class), as a blackboard. On this blackboard, teachers present some short courses, examples, exercises, and students put their questions, resolve exercises and make any propositions. The most inconvenient in this method is that information is considered as events that are pulled on the wall day after day. The wall became speedily a very big stack of events. To look for some information (an event in this philosophy) is not really practice. The idea to make directories that contain courses is a good idea. This is possible by some options in Facebook groups structure, where user can save files, photos,… in specific tabs. But the more important, which are discussions, questions, and answers are often pulled in deep levels in the wall, once the group evolution became fast. Really, there is no practice solution for these problems. The learning process must be adapted to the nature of Facebook philosophy. Sometimes, supervisors are obliged to shift some old event to be on the top using empty comments. These kinds of events are those which are considered as motivation and attracting events. Sometimes, supervisors of the group were obliged to send courses, and information that are considered important directly to some members. This operation is really, not a practice solution, once the number of students becomes important.

The quantity of information can make the process very complicated. If everyone can put what he wants (and this is the idea of Facebook), the group will be rapidly very heavy with information. Even important, this huge quantity of information can make the process of learning very complicated, and beginners will not be motivated or interested by the group. Supervisors have avoided this problem by limiting type and quantity of information to be put in the group. Some members were very enthusiastic and the important number of new subscribers in few time let them to think to make big courses, and to go fast in the learning process. But really, the experience proved that the number of subscribers in this kind of classes must always be considered carefully. The free and the open inscription bring some subscribers that they are curious to see what happen in this group and so they are not really interested by learning. Some other subscribers are like other Facebook admirers attracted by small quantity of information. They prefer to not read lot but to see lot. The rule that must be respected to insure the success of the class is to focus on brief descriptions, photos, vid-

eos, and short comments. In this direction, supervisors put slides with few lines, every time, when they want to present some idea to programmers.

Naturally, the extra freedom in the net and so in Facebook can make behaviors of some members abusive and perhaps bad. The problem, in such groups, is that one doesn't know the members of the group, and supervisors have not established this as a condition. The group is free and no condition is required to be a member. If initially, the group started with some students that supervisors know, in some days the number has been passed to more than 200 members!!! Since, the creation of the group, one case was met where an unknown member behaves abnormally and publishes some undesirable comments.

7. Related Works

Despite the spreading of Facebook and some other platforms as social networks (SNs), attracting millions of peoples through the world, the application of these SNs as learning environments is not yet a prevalent idea. This is due to the nature of SNs, which favorites their use as an "amusement" and "news" sites. However, some works which have tried to exploit SNs as learning environments can be founded in the literature. In [7], authors presented a research carried out during the 2009/2010 academic year using Events Management students at level 4 and level 5, in Manchester Metropolitan University. This work analyses the impact of Facebook to motivate and to attract students in the critical analysis of academic theories. In [2], authors aimed to present an evaluation of the unexplored educational benefits of Social Networking Services (SNS). Graduate students of finance course (North Carolina State University) are enrolled in distance education courses using Ning in Education. Ning is a platform which offers customers the ability to create a community website with a customized appearance and feel, feature sets such as photos, videos, forums and blogs, and the service layers in support for "Like" (with integration in Facebook, Twitter, Google and Yahoo). Ning in education is an educated-based SNS for teaching and learning. In this study, authors suggested that education-based SNSs can be used most effectively in distance education courses as a technological tool for improved online communications among students in higher distance education courses. In [11], authors present a learning environment on Facebook. Their case study was a class of 1st year degree in primary education, in the course of Information Technology and Communication in Education. They concluded that Facebook can be used as a resource/teaching tool important to encourage greater participation, interaction and collaboration in the educational process. The Elgg social network (http://elgg.org/) was also used as a learning platform in some works. In [6], Dron and Anderson stud-

ied an online undergraduate course taught via the Elgg social networking platform. They consider the experience as positive, but they conclude that students are "lost in social space" and need support and scaffolding to participate in the social network. Another work, [13], presents a case study of learners' perspectives and experiences in an online course taught using the Elgg platform. This study was conducted in the context of an optional online graduate-level course taught at a large public university in the United States. One of the results in [13] is that students need support to navigate the online social network.

In this current work, authors have presented an experience of the use of Facebook as a teaching and e-learning environment. The idea was to create an open-free group to enhance the ability of students in the Java programming. The motivation of this work is the important spreading of Facebook as a social network, and the widely presence of students on the social network site. The results are encouraging.

8. Conclusion

The learning process recognizes new and open dimension by the development in telecommunication technologies. The spread of the internet in the entire world, and in particular in Arab countries, allows the emergence of new ideas, methods, and styles in the learning process. Many classic constraints disappear. Constraints on locations and times are no more important. The learning process can be done at anytime and anywhere. The presence in the same time of the teacher and students is no more an obligation, with the possibility of offline learning and communication. Recently, social networks are the most famous sites that attract peoples of all categories. Facebook can be seen in the top of these social networks. It is open, free and very popular. The presence of students and teachers on these social networks is evidence in our time. The idea to use Facebook as a learning plat-form presents in the same time an innovative idea and a challenge to be realized. In this paper, authors have presented their experience in the use of Facebook as a learning platform. The objective was to study the Java Programming under Eclipse Environment [26]. The teachers are a set of voluntary teachers. The students were, firstly, the 2LMD level students, but many other levels took part now. The first results were very encouraging to the teachers and to the students subscribed in the virtual class. When writing this section of the paper, the number of subscriber is more than 380 subscribed and 17 subscribers are often active in the group and produce expected results. The learning process met many problems which depend on the Facebook nature and also to human factors, but the obtained results are really motivating to continue the process.

In its first implementation, the idea was so naive and authors have not expected this important popular-

ity of the virtual class in the students' community. The virtual class has no predefined program or plan. The only objective was to enhance knowledge of students in oriented object programming with Java. Supervisors make dynamic program to the class, according to the reaction and the readiness of members. The current step is the formation of programming teams, which are supervised by teachers and develop small projects in Java. Some teachers are inspired from this idea to create some specific web site to these small projects. Authors think that in the near future more creative ideas will be discovered that will enhance the level of all the class in the Java programming. This will create some community of high level programmers in Java in the few next years, which is the global aim.

Acknowledgment

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Laid Kahloul obtained his Phd in 2012. Dr Kahloul is a teacher and researcher in the computer science departement, Biskra University. Dr Kahloul is intersted about software engineering, formal methods, artificial intelligence, and creative learning techniques.

Samir Bourekkache obtained his Magister diploma in 2009. Mr Bourekkache is a teacher and a researcher in the the computer science departement, Biskra University. Mr Bourekkache is intersted to formal methods, artificial intelligence, and e-learning techniques.

Okba Kazar obtained his magister degree by 1997 from Constantine University (Algeria) working on artificial intelligence field. He obtained his PhD degree from the same university by 2005. He is member of editorial board of some international Journal and author of some publication in international journals. Pr. Okba KAZAR participates as a member of program committee in international conferences. He is interested and working in artificial intelligence field and multi-agents systems with their applications and also advanced information systems, Web services, semantic Web. Okba KAZAR actually is full professor at computer science department of Biskra University.