

INTERACTIVE LEARNING CONCEPT IN SPECIAL EDUCATIONAL PROGRAMMES FOR HIGH-PERFORMANCE ATHLETES

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Abstract: In order for children to maximize their athletic performances as young athletes, they must engage in high-performance sports resulting in the neglect of the academic training. As the athletic career comes to an end, the lack of certain non-athletic competences influences the difficulty of socio-professional reintegration of the former athlete. The training and competition schedules make attending to regular classes impossible. The way the regular playing season and the extra-seasonal training schedule influence the school attendance and academic performance of a cadets level volleyball team is studied. The paper identifies the way e-learning can be used to efficiently help athletes to stay in touch with school, without interfering with their athletic career.

Keywords: e-learning, lifelong learning, distance learning, athletes' education, Moodle plugin, CAT, virtual class.

I. INTRODUCTION

E-learning is an interactive educational process that encompasses “web-based learning”, “computer-based learning”, “collaborative learning”, “interactive learning”, and “virtual learning”. It also provides the educational material on communications networks (Internet and mobile networks), via satellite or interactive television, and magnetic or optical support. “Web-based learning” is a term associated to the distribution of the educational materials via the Web. Considering the development of wireless technology we can use a new term for distance learning, “mobile learning”. The term “mobile learning”, or “m-learning”, is derived from the term “e-learning” and defines teaching and learning with the aid of mobile systems. These systems allow the display of the content in

compact format, and fulfil the bidirectional communication between teachers and students through the wireless networks.

Distance learning is not an automatic process. According to the e-learning principles, there is the need for human intervention. There are three classes of participants in a distance learning process:

- Producer of e-learning materials
- Provider of e-learning services
- User of e-learning services

The **producers** of the e-learning materials are the course authors, graphic designers, audio-video technicians, web designers, and other personnel involved in the actual creation of the distance learning materials. The **providers** of the e-learning services are the personnel of the distance learning department or institution the internet providers, and

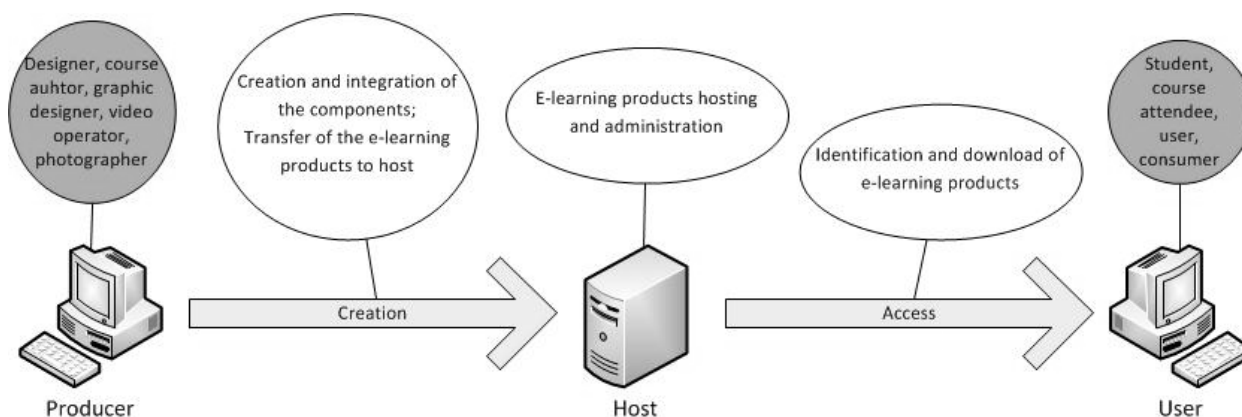


Figure 1. Processes and participants in an e-learning system.

the institution's technical maintenance team. Generally, the **users** are the students, the beneficiaries of the e-learning system. If the e-learning system is designed as a LCMS (Learning Content Management System) respectively LMS (Learning Management System), the administrators of such integrated educational systems, the teachers, tutors and students are considered users of the e-learning services. Generally, we understand by integrated e-learning system a complete system that contains the hardware component, the network, and the software applications dedicated to the educational activities. Such a system presents a high degree of integration, and allows the educational materials to be provided, the management of the educational activities, and communication facilities.

There are three types of e-learning system models that have evolved from the traditional teaching methods. All of these models are aiming at providing educational solutions that overcome them. When implementing an e-learning system, one must take into consideration the technical level available for its development. This is the parameter that differentiates the three models mentioned earlier.

The **self-directed e-learning model** is the simplest one. It is suitable for users experienced with continuous learning and professional development, willing to focus on certain subjects. The content is provided in HTML format, multimedia presentations, demo clips, and interactive tests. As in this model there is no tutor to oversee the study session, all actions must be specified within the presentation of the educational content. Furthermore, such a system does not encompass a communication system between students, therefore each being independent one from the other, hence the name "self-directed".

The **facilitated e-learning model** combines the architecture of the self-directed model with communication facilities, such as e-mail and forums. The transfer of the educational materials is done via the forum, that has unlimited access for the users. There is a course administrator, a tutor, which answers the students' questions on the forum, controls the educational process and the students' activities. Such a model is suitable for students that cannot keep up with an established schedule but need a minimum level of communication facilities in order to achieve the targeted results.

The **advanced e-learning model** uses the Web technology for the management of the whole educational process. This model uses the real-time audio/video streaming, chat, whiteboard, online data transfer. All these facilities are added to the facilitated e-learning model. Furthermore, the educational process is controlled by using an established schedule that all students are bound to respect. Such a model is constructed based on the educational act management block (Learning Management System). This way the informational content is swept gradually, allowing the student to study in detail a given subject. Using the audio/video communication facilities distance learning courses, online tutorials and demo clips can be scheduled.

An e-learning platform includes procedures and instruments that facilitate individual study at own pace. The minimal requirements for using such a platform start with the candidate selection and students subscription procedures, synchronous and asynchronous communication between students, tutors and administrative personnel. It also includes the enrolment of students to the courses,

monitoring and archiving securely the information provided to the students. The platform offers solutions to individual and group online and offline assistance. It also includes modules that collect statistical data regarding both the students and the usage of the provided educational tools. The statistical data will be used to improve the educational services provided. The platform provides access to the various educational and communication resources: online databases, news, e-mail, synchronous and asynchronous group discussions, online seminars and lectures, virtual library, and online and offline self-evaluation facilities. Another important platform facility is acquiring student feedback with respect to the platform performance and course materials.

Creating educational content consists of six specific procedures:

1. Intake of the rough educational material, its digitization and posting on the platform;
2. Synthetizing the content, creation of materials specific to individual learning (MS Office formats, *.pdf, html, etc.);
3. Loading the synthetized content in the platform virtual library;
4. Creation of the interactive material, based on the synthetized content stored in the virtual library;
5. Loading the interactive content in the virtual multimedia library;
6. Organizing the multimedia library into sections specific to each course.

The course authoring tool implements all but the first step, providing the tutor with instruments for working with the synthetized content and organizing it accordingly with the aim of the course. This way the information arrives at the student in a compact and easy to use manner.

Currently, the Romanian high-school curriculum does not differentiate between high-performance athlete students and non-athlete students. For the main fields of study there are the same requirements for these two categories of students. High-performance athletic students study their sport of choice at a specialized high-school. Given their special nature, the sports high-schools are not as frequent as theoretical high-schools. As a result, each such high-school owns a campus-like compound, consisting of not only training facilities suitable for the sports studied, but also housing and refectory facilities for its students. Despite all these conditions for proper athletic training and minimal non-athletic education, the final national exams (such as the Baccalaureate) do not differentiate much between the two types (theoretical and athletic) of high-school students. Furthermore, both the educational and social systems have difficulties with integrating the high-performance athletes during and after the end of their athletic career. This is due mainly to maintaining the same requirements with respect to the informational retention factor for students with different study plans.

II. RELATED WORKS

Education of high-performance athletes is a problem that appears at global level. Guo et al. in [1] present the design and implementation of an e-learning system for the Chinese National Sailing Team. They present the general problems regarding the professional training, the cultural learning and the specific, psychological training for the London 2012 Olympic Games of both the athletes and their coaches. The

platform was designed to cost as little as possible, to be as easy to maintain as possible, and to be as accessible as possible, considering the specific training scheme of the sailing team. It is designed to limit in time the unconscious athletes' Internet access, preventing the athlete's distraction. The platform contains educational material for 12 subjects related to the sailing team purpose, participating in the London 2012 Olympic Games. English language study, divided in two categories: "Sailing English" and "Basic English", Computer Learning, Hydro-meteorology, Fluid Dynamics, Sailing Rules, Sailing Training Review, Athlete Database, Chinese Literature, Nutrition, Anti-doping, Psychology, and Etiquette. All these subjects help the athlete improve his or hers performance in the sailing team, as athletes and make a good image, as informal representative of the nation.

Iskandar et al. study in [2] the implementation of computer-based sports training. The central question addressed in this paper is the appropriate formal representation of learning outcomes in the motor skill domain so they can be interpreted and manipulated by computers as well as humans for the implementation of computer-based sport training. Instructional design usually begins with the specification of behavioural objectives or intended learning outcomes. The field of educational psychology has long been sensitive to the desirability of establishing learning objectives for instruction. Learning outcomes that can be processed by a computer in the motor skill domain, however, seem to have remained the silent partner of learning outcomes in both the cognitive and affective domains. They present a conceptual model of learning outcomes in the motor skill domain for the implementation of computer-based sports training. The heart of this model is to treat athlete's skill as a contextualized space of capability either actual or potential. Rowing is the sport chosen as the study domain for the authors.

Caput-Jogunica and Razbornik present in [3] the role distance learning plays in the education of top-level Croatian athletes. Altogether 352 female athletes participated in their research; most of them were in the 18 to 21 years group of age. To determine the interests and attitudes of top athletes in the educational system, a specially designed questionnaire was prepared. The athletes' success serves an important social function in our society, and when it comes to their career it is in the national interest to support them in education with programmes that allow athletes to be more flexible in their studies. With the purpose to establish the new E-study for athletes the authors have made the proposal of the Operational activities model. This model has to be implemented in the process of creating new distance learning program that particularly meets the needs of athletes.

III. PROBLEMS IN THE EDUCATION OF HIGH-PERFORMANCE ATHLETES

The professional career of high-performance athletes is strongly connected to the age of the athlete. To be efficient, to obtain high-performance, one has to start practicing sport at a very young age. As a result, generally the academic instruction is neglected in favour of the athletic training. This leads to inevitable lack of extra-sportive competencies for the students and, at its turn, is the cause of the difficulty of social and professional reintegration of the former athlete, once his or her sporting career comes to an end. The main

problems and difficulties that athletes encounter can be separated in two classes: the ones that appear during their career and the ones that appear after their athletic career comes to an end. All these difficulties are connected to the extra-athletic preparation of the students or are its consequences.

In order to achieve success, the athletic career must begin at a young age, about the time non-athlete children begin going to school. **During the athletic career**, the academic training is considered of second importance. Maintaining this approach determines the deepening of the gap between the actual and expected knowledge of the athlete on a certain matter. The athlete student will acquire practically habits and skills that are valued in a modern day company. An athlete will learn to be *disciplined*, by respecting the indications received on the playfield, and outside the playfield will obey a given schedule. He or she will also learn to *respect a hierarchized authority*. In the sports life it is represented by the team captain (on the playfield) and the coach (both on the playfield and outside it). Furthermore, if practicing a team sport, the athlete will learn in practice what *teamwork* is, and how it works. She or he will learn that not all the members of the team have to share the same physical capabilities, and that on the field, each team member has a different role. She or he will also learn that the key element in teamwork is being in the right place at the right time. Unfortunately, these skills, as valued as they are, are not sufficient for hiring at the end of the athletic career. Just by mastering these skills, social reintegration is not guaranteed at the end of the athletic career. The sports-oriented high-schools in Romania are geographically located at large distances one from the other, and are not present in every city. This obliges all their students to live in the high-school housing facilities. As a consequence, the athlete student will suffer an emotional shock due to the sudden change in the living environment, and the rupture from hers or his social environment, friends and family. Not overpassing this shock will create collateral issues that can emerge at different point in the athlete's career. An athletic student's weekly schedule is very tight and rigid. During the *weekdays*, it consist of two training sessions, in the morning and in the evening, breakfast, lunch, and dinner at precise hours and on a strictly controlled diet, and mandatory resting times. In addition, the early morning wake-up and night lights-out are at fixed hours. During *weekends*, the schedule is centred on the official game (match). If it is a home play, then the program is less restrictive, consisting in an official training before the match. In the case of an away game, the trip to the playing venue and back add up to the schedule. The classes organized by the sports-oriented high-schools follow the appropriate curriculum for the age and year of study of the student, but omit certain subjects, such as vocational courses (painting, music etc.) and administrative meetings. It is considered that sport is a vocational subject, and the general philosophy is that one cannot study intensively more than one vocational subject. The administrative subject is considered to be substituted by the locker talks between the coach and each of the team members. All the students attend the same classes, centred on the classical theoretical subjects: Romanian language and literature, mathematics, physics, chemistry, biology and a foreign language. Thus all subjects towards witch a student may have native skills, which can prove useful at the end of the athletic career, and

Săptămâna 2 – 8 aprilie 2012						
2 aprilie 2012	3 aprilie 2012	4 aprilie 2012	5 aprilie 2012	6 aprilie 2012	7 aprilie 2012	8 aprilie 2012
Wakeup and early warm-up 6:30	Wakeup and early warm-up 6:30	Wakeup and early warm-up 6:30	Wakeup and early warm-up 6:30	Wakeup and early warm-up 6:30	Wakeup and early warm-up 6:30	
Breakfast 6:45	Breakfast 6:45	Breakfast 6:45	Breakfast 6:45	Breakfast 6:45	Travel for the official away game 7:00 (1-7 hours)	
Classes 7:00 – 11:00	Classes 7:00 – 11:00	Classes 7:00 – 11:00	Classes 7:00 – 11:00	Classes 7:00 – 11:00		
Morning training 11:30 – 13:00	Morning training 11:30 – 13:00	Morning training 11:30 – 13:00	Morning training 11:30 – 13:00	Morning training 11:30 – 13:00		
Lunch 13:30	Lunch 13:30	Lunch 13:30	Lunch 13:30	Lunch 13:30		
Tutoring 14:00 – 16:00	Tutoring 14:00 – 16:00	Tutoring 14:00 – 16:00	Tutoring 14:00 – 16:00	Tutoring 14:00 – 16:00	Official training session 11:00 – 13:00 (15:00 – 17:00)	
Rest 16:00 – 17:00	Rest 16:00 – 17:00	Rest 16:00 – 17:00	Rest 16:00 – 17:00	Rest 16:00 – 17:00		
Evening training 17:30 – 19:00	Evening training 17:30 – 19:00	Evening training 17:30 – 19:00	Evening training 17:30 – 19:00	Evening training 17:30 – 19:00		
Dinner 19:30	Dinner 19:30	Dinner 19:30	Dinner 19:30	Dinner 19:30		
Lights-out 22:00	Lights-out 22:00	Lights-out 22:00	Lights-out 22:00	Lights-out 22:00	Rest 21:00 – 8:00	Rest 23:00 – 7:00
						Official (away) game 11:00 – 13:00
						Return from the official away game 15:00 (1-7 ore)

Figure 2. The weekly schedule of a high-performance athletics high-school student.

need development, are ignored in the academic training. The counselling and orientation departments that exist in every high-school are intended to counsel the students through the athletic preparation, and not towards counselling the students with respect to the life after the athletic career. The week-round tight schedule does not allow the student spare time that they could be used for studying extra subjects, or developing hobbies. On the other hand, the non-athletic students have a less tight weekly schedule, and have the ability of managing their spare time. In their considerable spare time, non-athletic students can study subjects outside their curriculum, such as: sports, music, arts etc. Furthermore, non-athletic students can continue engaging in this study during the summer holiday. Athletic students have a summer tight schedule as well, consisting in two physical training sessions, both two week long, one at the seaside and one in the mountains. This prevents athletes from engaging in extra study during the summertime, be it study of curricular subjects, or personal hobbies. This is another impediment for the athlete student to develop skills that will be helpful in the social and professional reintegration after the end of their athletic career.

Generally, an athlete's career ends when she or he is in the biological prime age, her/his 30s. Cases when an athlete continues playing beyond that age are very rare. At this age, the effects on the muscles and bone structure of the athlete, caused by the sustained effort over the years appear: higher frequency of accidents, lengthening of the necessary recuperation period. This lowers the efficiency of the athlete on the field, which in turn lowers the team efficiency and performance. The most important problem that appears **after the end of the athletic career** is the employment opportunities. Many former athletes continue working in the sports-related field: coaches for teams of different

professional level and on different competition tiers, personal trainers, and executive or management personnel in sports-clubs. Continuing the activity in sports-related field highly depends on the sport the former athlete has performed: e.g. a former weightlifting athlete will have more difficulty in hiring as personal fitness trainer than a former volleyball player or a gymnast; the latter have a more uniform muscle solicitation and development throughout the athletic career than the former. Most of the former athletes, however, cannot find a job in any sports-related field. Thus they remain unemployed or have seasonal jobs, using the few extra-athletic skills they obtained during their early life (e.g. PC skills, driver's licence). The athletes that do not find a suitable job in a relatively short time interval after the end of their athletic career become forgotten, and psychically destroyed due to the lack of activity, and become a social burden.

In order to acquire competences outside the athletics educational curriculum, the athletics students have to attend extra-curricular courses. Their full schedule, as presented above, prevents them from attending regularly organised extra curriculum courses. E-learning presents a high degree of schedule flexibility, and full access to educational materials, independently from the student's location. Actually, blended learning as a special complex form of education, involving face to face teaching and online learning acts, seems to be the best approach for athletics students focused on both sport and education.

IV. INTERACTIVE EDUCATIONAL COMPONENTS

To overcome the problems mentioned above, we propose a series of solutions aimed at improving the educational process of athlete students during their professional career.

The method we propose is a flexible one, which can fold on the busy schedule of the students, and the educational material structure eases the study.

Moodle (Modular Object-Oriented Dynamic Learning Environment) is a free and open-source course management system (CMS) based on the social constructionist model of pedagogy [6]. Moodle is one of the e-learning platforms that have been increasingly gaining popularity in the last years. One major advantage of Moodle is that it can be used anytime anywhere despite the students' or teachers' busy schedule. Moodle supports a self-directed learning-oriented space for receiving new information in a more engaging, interesting, and easy way. It is important to notice that by allowing a better and visually pleasing access to external resources, students learn much faster about technology and learn with technology [7]. Some of Moodle's disadvantages identified are [7]: difficulty of assessing student progress, limitation of tools, lack of teacher control, difficulty in keeping students on tasks. Some of these gaps are resolved by the tools described in the following. Moodle itself does not provide a video streaming function, only file storage area. Improving Moodle's features with such a new component increases the student's retention degree with about 80%. One audio/video meeting helps the teacher to deliver new information in a more precise and easy way. Our solution comes as a set of new software components that adds interaction capabilities to Moodle e-learning software platform. The new developed plugins, illustrated in Figure 3, enable customizing the high-level interaction model offering virtual classes, course authoring tools (CAT), evaluation tool for progress monitoring and parent supervision of student's activity. In other words, one creates the interactive educational content using a series of specialised tools and instruments, such as the course authoring tools, web authoring tools and tests and quizzes generators. The virtual class educational component supports online face to face course meetings and ensures the student - teacher, teacher/student - educational resources/statistics/quizzes interaction. By using the new technologies in creating the educational material, one obtains simple, easy to use interactive courses, which avoid monotony and prevent the boredom of the student, and capture the attention of the student on the entire duration of the course. The teacher has the possibility to control the audio/video communication and resource import during the meeting. During the online meeting one teacher can communicate information to one or more students. Data is displayed in the shared virtual space where the tutor may use text annotation and interaction tools. The annotation feature helps presenting new data in a more precise and unambiguous way. For example the teacher can encircle certain key words or can draw a simpler figure as he goes on through the course materials. By using the interactive tutorials, the learning activity is pushed towards entertainment. This is due to the fact that a high-performance athlete student, considering the busy schedule, is more likely to engage in leisure-like activities, rather than

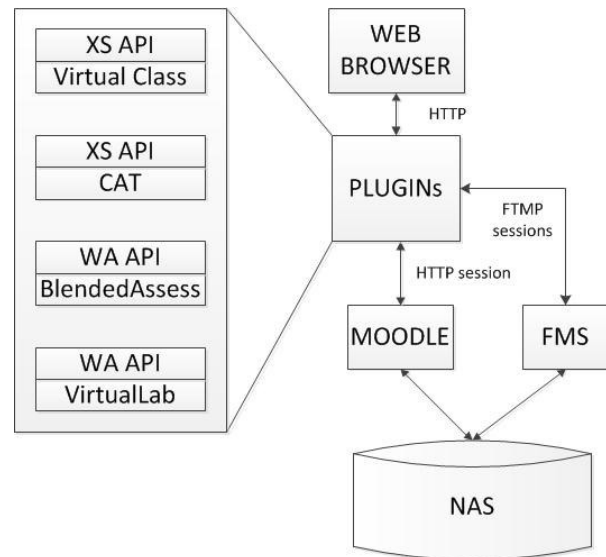


Figure 3. System architecture.

serious activities. By engaging in an entertainment-like learning activity, the retention factor reaches a high value.

The course authoring tool is especially designed for interactive educational resources management. It enables resource import in its original format (*.ppt, *.pdf, *.doc, *.rtf, *.html, *.mp4, *.avi, *.mov, *.mp3, *.flv). Once loaded resource, teacher can annotate it using interactive audio/video records or animations. The tools for managing and monitoring the educational activities allow the tutor to browse the types of individual study activities, schedule and monitor those activities. The individual study activities can be individual assignments, small-group projects, interactive tutorials, and small-scale practical works. The educational monitoring tools have an interface for real-time collaboration between the tutor and the students. The tutor can add new educational resources, based on the *problem based learning* concept, for pure individual study, or *project based learning* concept, for small-scale group assignments. The component for the educational activity management contains tools for the management of the individual (practical) activities and for the educational content management. It contains tools for planning and monitoring the student's individual (practical) activity or of the real-time collaborative activities during the individual assignments, group projects, or the interactive tutorials. The evaluation of the knowledge, takes place at the end of each educational activity. Evaluation of student progress is another important feature of such an e-learning platform. For managing and monitoring the student's individual activities two generic software components are used: WA API and XS API. Both allow online access to hardware and software resources dedicated to the individual study. WA API implements the rich-client concept and represents a stable and easy to use multimedia tool for monitoring the individual study. It also respects the Model-View-Controller template. XS API implements the virtual share space component with the main features for resource control. It is based on the Citrix XenServer characteristics, which

encompass a set of virtualizing tools and Windows® or Linux® virtual machines management. In other words, each tutor is allotted a virtual machine that runs the software tools necessary for the management and monitoring or evaluation of the individual study. The tools for the individual (practical) activities evaluation allow organizing the semi-automatic evaluation process. The process will evaluate the number of times an educational material was accessed, the time it took each student to browse it each time. Although most of this evaluation is done automatically, the final evaluation verdict is set by the tutor, manually. He or she will have access to statistical data regarding the student's performance: the material access frequency, the evaluation performance. By interpreting these two parameters, the tutor can adapt the content provided to suite the student's capabilities, or point the student with further reading/studying references.

The student-side tools for individual study allow the student to browse the study subjects and the scheduled individual study (activity), such as software simulations, interactive tutorials, individual assignments or small-group projects. The interactive tutorials are complex educational materials and are intended to increase the educational act quality by practical demonstration of certain concepts and technologies presented through the course. These educational materials are stored in the virtual library and contain audio-video recordings, combined with simulated reality. In most cases the simulations and interactive tutorials are used to help the student through the theoretical support or the assignment. For a student to browse the interactive educational material, each has to be allotted a virtual machine accessible by web-browser, with no need for any application installation.

One feature Moodle does not imply is the possibility for a parent to survey his/hers child learning activity. For this purpose we offer a supervision component that allows one to access all data regarding the courses, lessons, exams his child attended. After interpreting the tests results, the tutor can schedule extra virtual meetings with the students that need further explanations and also communicate the results to the parent.

Among the extra services the platform provides, we mention the multimedia messaging and the electronic agenda. The multimedia messaging facility provides the tutor with both synchronous and asynchronous messaging both with the students and with other tutors or the platform's administrative personnel. By using the platform's **messaging service** both tutor-parent and tutor-student communication is provided. The tutor is assured that the message arrives to the receiver, independently from the activities the student is engaged in at the moment the message is sent by the tutor. The **electronic agenda** is a platform functionality that allows supplementary communication between tutor and student/parent by scheduling virtual meetings and project submission deadlines. The electronic agenda (or electronic calendar) will help the tutor manage all activities that have precise time duration or a precise deadline, such as project assignments submission deadline, final evaluation tests, partial evaluation tests, virtual and face to face meetings.

V. EXPERIMENTAL RESULTS

In order to illustrate the advantages of enhancing Moodle with course authoring and virtual class plugins, this section



Figure 4. Tutor side interface during a virtual meeting.

shows in detail the whole process of course management. The student-teacher, teacher/student-educational resources interaction is described starting with course setting and ending with course visualization. Figure 4 illustrates the teacher role application screen. The web camera attached to the user's device allows the tutor to observe the live audio/video broadcast in the top left corner of the screen. One first advantage of the course authoring tool is that the teacher can either run a live course session or record a video for students to individually study. Besides the video and audio feature, the plugin offers a resource upload component. In the example below the teacher loaded one educational resource in PPT format. Another major benefit is that the students can easily follow the teacher's audio explanation while reading the information written in the course material. Materials designed for tutor presentation can omit certain explanations that are given by the tutor at the moment of presenting the material. Due to the presence of a tutor which can clarify on the spot the student, this type of materials can be more complex than the ones intended for the individual study. The tutor will clarify, if necessary, the ambiguous concepts.

Figure 5 presents the live course meeting from teacher's perspective. In this case one can see that the tutor is recording the session, probably for future use. The tutor has total freedom in creating the educational content, with respect to the presentation logic and teaching scenarios. The two main teaching scenarios are the individual study and the classical presentation of the materials. The educational

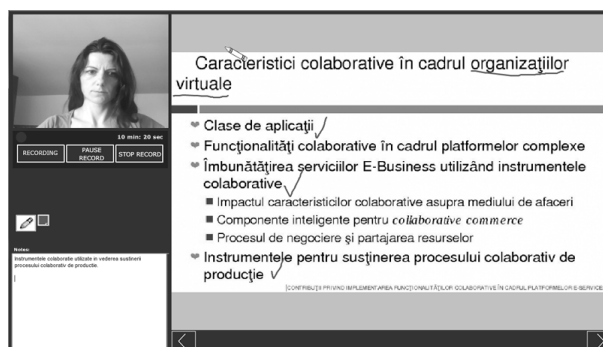


Figure 5. The tutor side during a recorded virtual meeting.

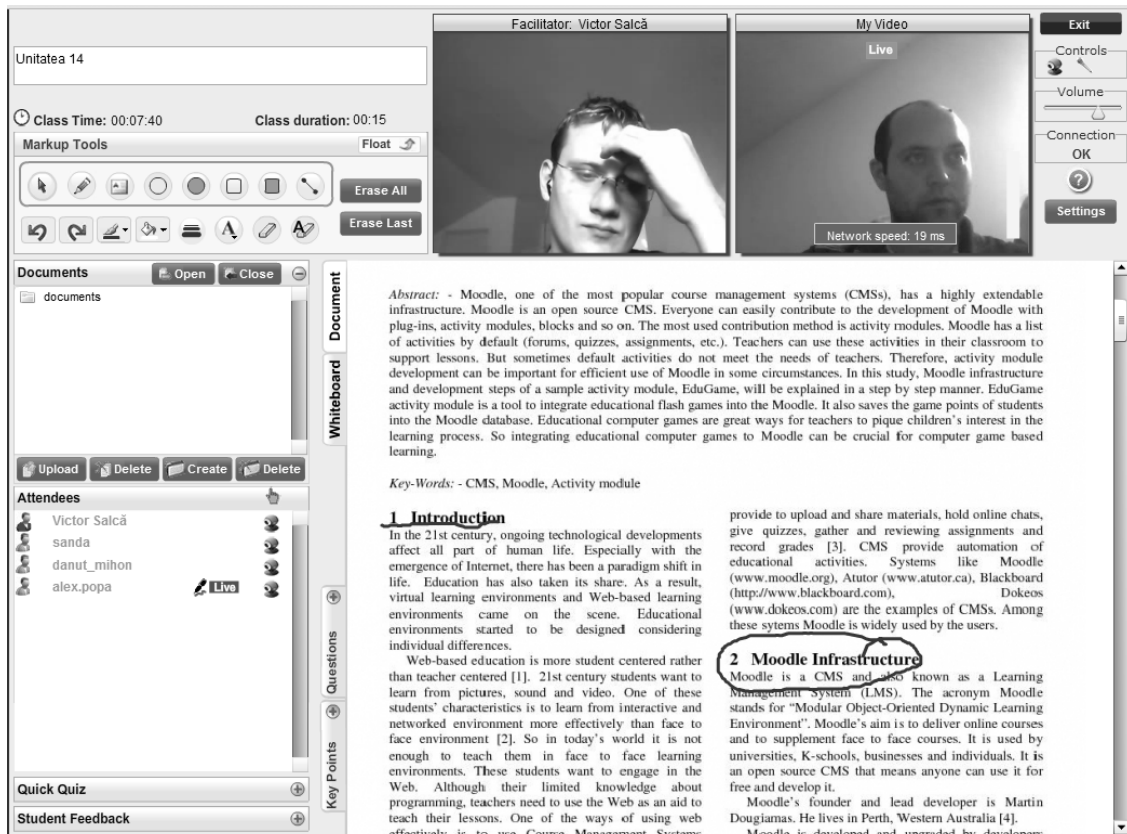


Figure 7. The student side of a virtual meeting while the.

materials designed for individual study are simple and clear. They are studied by the student at his or hers own pace, as many times as the student finds necessary, with no continuous overseeing by any tutor, but in a reasonable predefined time-span. The text annotation tool is used in this example in order to highlight important terms or subjects that have been already discussed. Both student and tutor may use the annotation tool to express themselves. The presentation logic and the easiness in exploring the content are very important to the educational content creation

process, as its outcome influences the retention factor. The non-formal education specifications state that the retention factor in such educational programmes is very high. The educational act centred on the student's needs is based on collaborative processes. In order to provide a good collaboration between students and between students and tutors, both synchronous and asynchronous communication is a priority. Also, in the bottom left corner there is a notes section that allows the student/teacher to write down some main ideas during the meeting.

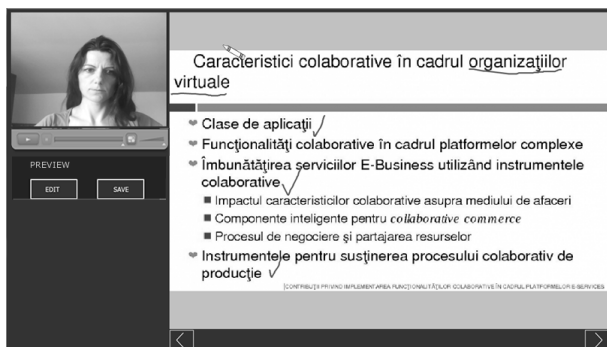


Figure 6. The tutor side of the interface after the end of the recorded session.

The example in Figure 7 describes the online live course interaction between one teacher and three students presented from one of the students' perspective. Participants are listed in the left bottom corner of the window. The top part of the screen comprises both the current user video stream in the right top corner. Course material is displayed in the centre of the shared virtual space. All participants can use text annotation and interaction tools during the meeting. Likewise, different documents can be opened and discussed during the meeting. By interacting with the student, via the technological gadgets (webcam, microphone etc.), the tutor verifies the ability of the student to browse the provided materials, and determines whether future educational content needs change or not.

The application allows the annotation of the captured media by sound, video, written text or animation, and the export of the resulted sequences to a file format suitable for providing it on the Internet. This type of applications is suitable mostly for the creation of tutorials or demo-clips.

Once the course meeting is over, the teacher can save, edit or preview the recorded session, as presented in Figure 6. The tutor can also record himself or herself while explaining course material in order to save the video as a tutorial or as a lesson. This way the plugin provides the individual study component, supporting the idea that the best retention factor is obtained in the case of individual study. The information in the theoretical support has to be synthesized and clearly explained. This way the student will receive the necessary information, with no ambiguities.

VI. CONCLUSIONS

This paper deals with the problem of the professional reconversion of high-performance athletes after their athletic career comes to an end. This moment comes when the athlete is still young biologically, but old physically. If this problem is not dealt with, the high-performance athletes become unemployed and a social problem. The main impediment for the professional reconversion of athletes is the lack of non-sportive competences and skills. To overcome this impediment, the athletics student must allow time for hers or his extra-athletic training and education during their athletic career.

The athletics students have a busy schedule both during the regular schooldays and the summer holiday. The regular schooldays coincide with the competition season and during the holidays the athletics students have two extra-seasonal physical training camps. In order for athletics students to develop extra-athletic skills and competences, we propose that the high-performance athletics high-schools organise alternative courses in domains for which the students show basic skills. We propose that these courses be created and provided based on teaching methods that use the new communication technologies. This eliminates the need for the tutor and student to be at the same time in the same room for the teaching process to take place. This also helps adapting the study program to the student's sport centred schedule.

We designed and implemented a course authoring and a virtual class Moodle plugins. These plugins facilitate the educational act without the tutor and the student (or students) to be in the same room, at the same time. The plugins allow real-time communication between the tutor and the students, the presentation of educational materials to the students, and the recording of the virtual meetings. The plugin supports a wide range of formats for the uploaded educational documents.

The interactive educational materials provided to the students and the virtual meetings between tutor and students are facilitated by the new telecom technologies, by real-time audio-video streaming applications that use broadband Internet. These applications are gathered on an educational platform that eases the student's access to the content, independently of hers or his location at the accessing moment. This enables the student to take part to the virtual meetings non only while in the high-school campus, but also while on the away-game trips or even the physical training camps, provided that the schedule allows it.

We propose that these facilities be integrated with the sports management and analysis systems that the athletes already use. This will enable them to access both the academic results and the athletic performance statistics. To reduce the maintenance costs and to ensure a unitary set of supplementary skills and competences taught to the students,

we propose that this platform be coordinated at national level by an interdisciplinary sports governing bodies association, or a state authority such as the National Agency for Youth and Sports.

Therefore, this paper describes a new set of plugins that enhances the standard capabilities of Moodle e-learning software platform. The new designed high-level interaction model provides virtual classes, course authoring tools (CAT), and evaluation tools for progress monitoring and parent supervision of student's activity. By using these new software components the learning activity is pushed towards entertainment, avoiding monotony and preventing the boredom of the student.

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