On online courses

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Abstract— In this paper, we are focused on online courses in the context of entrepreneurship. We describe some important features of existing online courses. We point out some aspects on tools used to developing online courses: hardware, software, e-learning platforms, online advertising, etc. In order to maintain the relationship with the customers, we can apply many surveys. In our paper we present such an survey and the results of data analysis.

Keywords— e-learning, courseware, online courses, marketing online.

I. INTRODUCTION

THE e-learning themes have been a research subject for many years, but the impressive evolution in IT areas open a new outlook on learning and education.

Generally, the interest for e-learning development comes from areas such as university studies, school studies, corporate training or other sectors.

E-learning and distance learning tools have been well-known for a long time, but thanks to facilities offered by cloud computing technologies and social networking tools, today, the social learning concept has been developed (e.g., http://adaptcourseware. com/, https://www.coursera.org/, etc).

In this paper we are focused on presenting features of business models, containing online courses as subject of activity.

In Section 2 we point out the characteristics of some existing online courses. We also present existing tools used for building such a business (hosting, software platforms, online advertising, etc.). In Section 3 we present characteristics of one of our online courses, and finally we draw some conclusions.

II. ON FEATURES OF ONLINE COURSES

The last years, especially the last 2-3 years, have been characterized by an explosion of online course offers - free, or paid – some very cheap, some quite expensive. The price does not reflect the quality of the courses, but, in some cases, is dictated by the marketing politics of the provider.

In our study we do not consider corporate training, university and school studies, we focus on other online course offers.

Let us consider some features of existing online courses. In our study, we take into account the different stages of the relationship with the student: before the course period, during the course period and when the course is over. In order to attract student interest to an online course, we can provide: a free demo course, information on the course format, a course syllabus/ schedule, a course outline, a course logistics (e.g., including software), etc.

Generally, in order to follow an online course, for a certain time period, the student has an account on a web site. In many cases, there is an initial presentation section, which introduces the student in the course environment (the most common are video presentations).

Surveys can also be used in all stages of the relationship with the student.

In different situations we can find a pre-course survey. The pre-course survey is used in order to detect the student intention: if he is interested only for documentation or he is interested also for a progress evolution and certification (even if a big part of online courses provide certificates, it is important to know that the most of them are not recognized). In some situations, official testing (at a charge made by testing centre) is required to gain officially certified and recognised qualifications. The pre-course survey will help us to improve the quality of our course. In the case in which a student is interested only for documentation, the results of the quizzes and homework assignments are not very important, in the case they yield poor results. If, on the contrary, the student is interested in achieving progress (and certification), if the results are not very good, it is a good idea to consider the reasons (we can see this thing very well, considering the results of all students - the isolated cases are not significant). This thinks will have a good impact for long time on your business. Also, at this step, it is important to specify the student's recommended background.

When a student is enrolled in an online course, he has available different course tools:

- lessons in various formats containing text, formulas, code, images, etc;
- audio lectures, video lectures;
- interactive interface, etc.

In addition, he can find references, tutorials and resources, data sets, books (free or with link where the student can buy them in paper format or e-book - e.g. on www.amazon.com, etc.).

During the online course time period, the student is subjected to quizzes, homework, assignments, exams (partial or final) / tests and, generally, he can find out, in real time, the assessment test results.

Many online course websites, provide real time information on the student's progress, such as:
- assessment test results (skills assessment);
- statistics: time spent, work done - skills practiced, progress achievement, completed activities and success rate /evaluation report, etc.

Also, when a student is enrolled in more courses than one, a transcript report can contain additional information, such as: course title, score, start date, last date, percentage done, percentage mastered, course hours, time spent, etc.

In order to facilitate the student's participation in a course, many websites offer different sections such as: wiki, FAQ/Help, contact support, contact tech support, live chat, blog, announcements with upcoming deadlines, etc. Also, for the interaction with other students, many websites provide discussion forums and chats.

Many online courses use video files where the teacher is featured.

If the language of the online course is not the native language of the student, often the video files are accompanied by subtitles/text transcript. A very special presentation of text transcript is offered by https://www.edx.org (the access to the online courses is free) - with a click on a word from text transcript, we can view the corresponding part of video file. Also, we can change the scrolling speed of the movie.

The student can change the settings in his/her profile. The information is different from a website to another, but, generally, we can find the following fields: gender, name, date of birth, email address, company name (if necessary), address, city, town, zip/post code, country, county/state, contact number, picture, websites (Facebook, Twiter, Google+, YouTube, LinkedIn, etc), yahoo ID, Skype ID, MSN ID, etc.

In some cases, on website, the student can find information on the team and teaching staff.

When a certain course is expired, after a period of time, a final feedback survey is generally applied. This survey refers to quality of course (initial goal and results); if the course helped the student in his/her professional development; if the correspondence with the technical or teaching staff was good; if the course has fulfilled the student's expectations; if the student wants to extend his studies by following another online course, etc.

When you want to start such a business, you need a web hosting service. You can implement an online course environment or, generally, you can find different offers. Some of these offers are free. See, for example, one of the most popular free source e-learning software platform - Moodle.

Depending on the size of your online course offer, you need staff for different positions, like the following: vice president/director of education services, manager of training services, trainer, instructional designer, program manager, director of product management, content engineer, software engineer, systems administrator, learning sciences engineer sales engineer, business development team, administration, recruiting, etc. For a small business the number of these positions is smaller.

Also, the features presented in this section are not used in all online courses. Some courses have certain features while other courses have other features. When you implement a strategy, you use those you think are more adequate.

We can promote such a business using different marketing tools. These tools must include online items. We can perform different analyses using a Google Analytics account (see also http://www.google.com/analytics/) where you can find out information about the visitors of your website. On this topic, see also, http://webtrends.com/, IBM coremetrics web analytics, Adobe Analytics Marketing Cloud solution or other web analytics tools. For paid advertising you can use: Google AdWords, Facebook Ads, Microsoft Advertising, etc. For advertising, you also use the SEO tools, discount websites (e.g. Groupon), etc.. In different stages of your business you can use some online marketing tools or others. We must have a customer database and tools for customer relationship management at all times. The continue analysis on the customer database will help you directing your business. The subjects on online marketing are also very complex, for more information, see also [4] and [5].

III. PRESENTATION OF AN ONLINE COURSE

Now, we present some aspects on a Data Structures online course (see http://co.mcvws.com/ moodle/). Here, we use the free source e-learning software platform - *Moodle*.

A. The course content

We do not speak here about the tools provided by this platform, but if you are more interested in its capabilities, you can find additional information on https://moodle.org/.

We have chosen a course type where the materials are posted weekly (see *Figure 1*). For notion presentations, we use docx/pdf. txt, jpg, mp4, xlsx files, NetBeans IDE project files, etc. In each case, we chose a file type as a way of communication, in order to improve the quality of the lessons. However, there are not rules. We can choose what we consider as adequate to the situation.

Information on references, course syllabus, the used software (we use NetBeans IDE) and its installation were posted in the first week course.
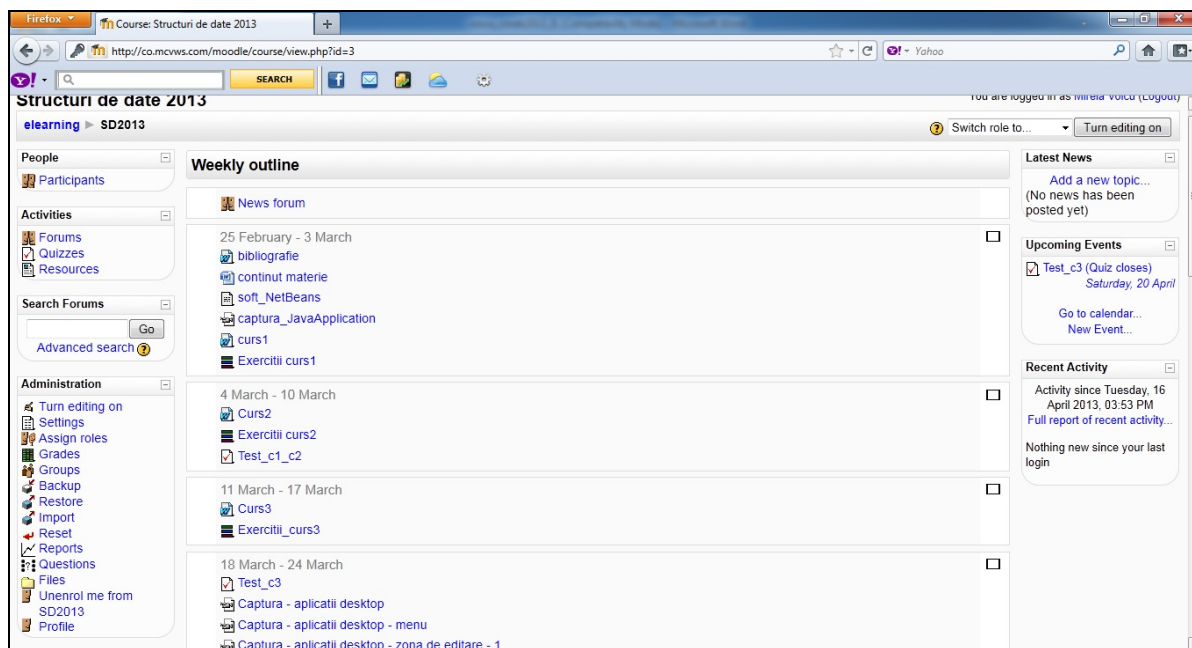
Figure 1 - An online course using Moodle platform

To display theoretical concepts, we generally use docx/pdf files.

Often, in online computer science courses, video capture are using. Our files are mp4 and we use SnagIT software application in order to create video capture. We can find many software applications for obtaining video captures, but we have chosen SnagIT because it makes the video files in a relatively small size and a very good quality. This is a very important aspect. Generally, online platforms offer video files in a good size (up to 10 or 20 MB, rarely they are up to 50 MB). If the size of your video file is bigger than 50 MB, we suggest you to reconsider the presentation. A very simple and good idea is to make more than one video file for a single presentation item.
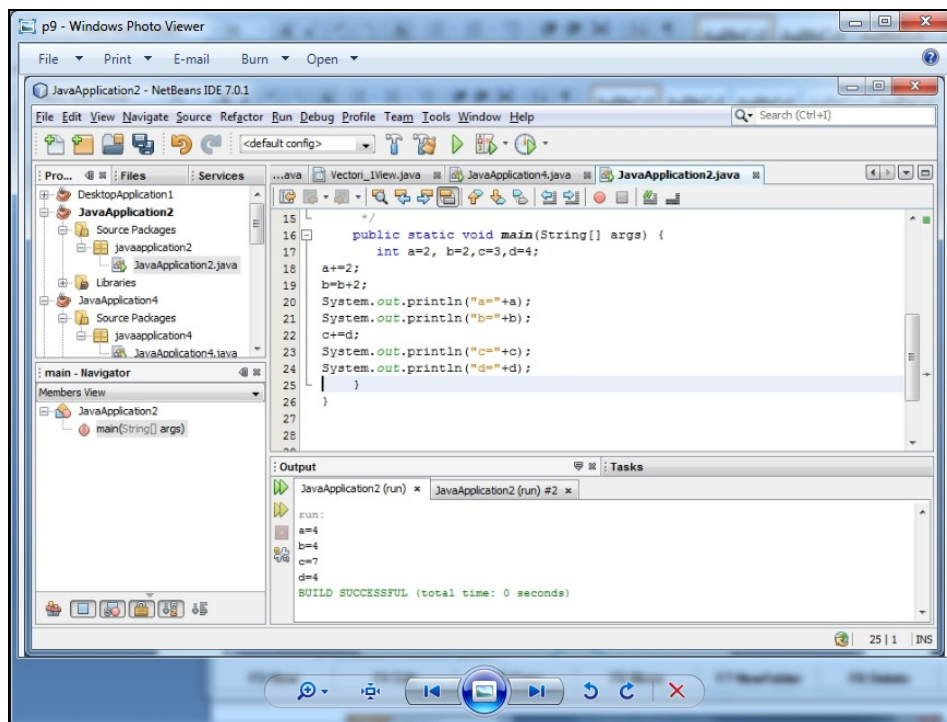

Figure 2 - Image files used for presenting execution result

With video capture our student can view (for courses in informatics) the way in which we implement the application, in the same manner as if he is near us, at the computer (see such an example - *video capture* on http://structuri.mcvws.com/).

For presenting a short example, we can use image files as the one presented in *Figure 2*.
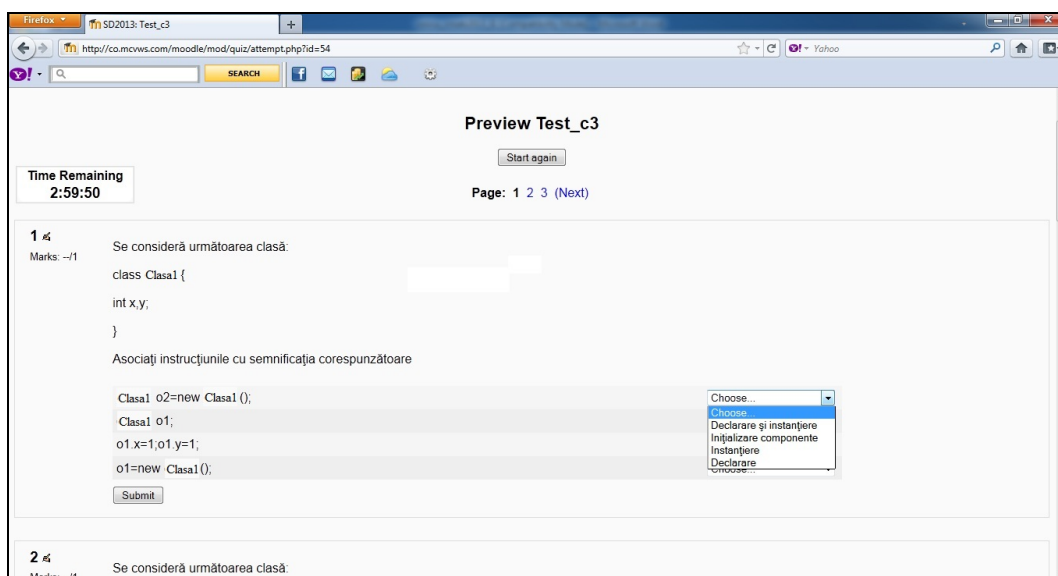
Figure 3 - Tools for test, quizzes and homework

Brief examples are numerous and using many image files, the student can browse quickly the examples. Also, we provide files (docx or pdf) with information on each example. The image files are a good solution only for brief examples. For applications, generally, we provide the source code from NetBeans IDE and video capture.

Moodle provides a very flexible tool for the implementation of tests. We use them a lot for homework. We leave two to three weeks for a homework, in which the student can recover it whenever he wants. This type of approaching homework is common on the online course platforms. In this way, the student learns in own pace. In *Figure 3*, you can have an image on the homework development. More information you can find in the Moodle documentation.

B. Software tricks used for improving the course presentation

The array sorting is an item in the data structure syllabus. One of the methods is the insertion sorting: in the given array of elements we will fix an item and check with the previous elements. If the assigned element is smaller than the previous elements, we will swap them until we obtain a sorted array (see also *Table 1*). For each value of the i counter we emphasize the value which will be inserted, the position where it will be inserted and the sorted array with the indexes between 1 and i.

Searching *insertion sort* in a web browser, you can find more information on this algorithm.

In order to facilitate the algorithm understanding, we consider a certain array (see *Table 1*). For an example, we can view our simulation at *Insertion sort* on http://structuri.mcvws.com/).

On website, for animation, we use a *HTML* file and *JavaScript* code. We denote with "..." the same situations for the array elements indexed from 1 to 8, like the situations presented for 0 and 9 indexes (in order to avoid a long code presentation).

```
<html><head><title>Data structures</title>
<SCRIPT language="JavaScript">
function f1(){
// we consider an array
b = new Array(); b[0]=2; b[1]=9;b[2]=2;b[3]=8;
b[4]=3;b[5]=7; b[6]=4;b[7]=5;b[8]=1; b[9]=6;
 //the insertion sorting method
for(i=2;i<=9;i++){b[0]=b[i]; x=b[i];
  //we emphasize the item which will be inserted
  if(i==1)form1.button1.style.background="#C80000";...
  /*we emphasize the position where the fixed item will be
inserted */

  if(i==9)form1.button9.style.background="#C80000";alert("o
k"); j=i-1; while(b[j]>x){b[j+1]=b[j];j--;}
  b[j+1]=x;
  /*we emphasize the sorted array, between position 1 and i */
  if(j+1==1)form1.button1.style.background="#C80000"; ...
  if(j+1==9)form1.button9.style.background="#C80000";
  alert("ok"); k=0;
  form1.button0.value=b[0];
  ...
  form1.button9.value=b[9];
  k++;if(k<=i)form1.button1.style.background="green";...
  k++;if(k<=i)form1.button9.style.background="green";
  alert("ok");}
}</Script></head><body><br>
```

<--*the HTML form - we use button type components in order to display the array elements*-->
```
<form    name="form1"><table    border=1><tr><td>  <input
type="button" name="buttona0" value ="b[0]"> </td> ...<td>
<input          type="button"          name="buttona9"
value="b[9]"></td></tr><tr>
<td><input         type="button"         name="button0"
value=""></td>...<td><input              type="button"
name="button9"value="6"></td></tr></table><br><input
type="button"           name="b1"           value="ok"
onClick="f1()"></form></body></html>
```

	b[1]	b[2]	b[3]	b[4]	b[5]	b[6]	b[7]	b[8]	b[9]
i=2	9	2	8	3	7	4	5	1	6
i=2	9	2	8	3	7	4	5	1	6
i=2	2	9	8	3	7	4	5	1	6
i=3	2	9	8	3	7	4	5	1	6
i=3	2	9	8	3	7	4	5	1	6
i=3	2	8	9	3	7	4	5	1	6
i=4	2	8	9	3	7	4	5	1	6
i=4	2	8	9	3	7	4	5	1	6
i=4	2	3	8	9	7	4	5	1	6
i=5	2	3	8	9	7	4	5	1	6
i=5	2	3	8	9	7	4	5	1	6
i=5	2	3	7	8	9	4	5	1	6
i=6	2	3	7	8	9	4	5	1	6
i=6	2	3	7	8	9	4	5	1	6
i=6	2	3	4	7	8	9	5	1	6
i=7	2	3	4	7	8	9	5	1	6
i=7	2	3	4	7	8	9	5	1	6
i=7	2	3	4	5	7	8	9	1	6
i=8	2	3	4	5	7	8	9	1	6
i=8	2	3	4	5	7	8	9	1	6
i=8	1	2	3	4	5	7	8	9	6
i=9	1	2	3	4	5	7	8	9	6
i=9	1	2	3	4	5	7	8	9	6
i=9	1	2	3	4	5	6	7	8	9

Table 1: Insertion sort simulation

In *Figure 4* we present an image in order to illustrate the algorithm used to calculate the sum of an array elements. Here we can observe that by using different application software

tricks, we can improve the quality of notion presentation. In *Figure 4* we have used a worksheet from *MS Excel*.

Figure 4 - Sum of array elements

IV SURVEY ON ONLINE COURSES

We know, very well, that in any business, the customer opinion is very important. For this reason, as we have pointed in *Section 2*, we must use different surveys during the relationship with the student.

In this section, we present, as an example, a pre-course survey. We consider a people group which graduated from the same specialization, the same college, but in different time periods.

Our survey refers to previous experience in studying online, in the last two years, and includes the following twelve questions:

Q1. The year of college graduation;

Q 2. The number of online courses which were studied in the last two years. We consider the following cases: 0, 1-4, 5-10, 10 to 20, 20-40, more than 40;

Q3.The general opinion on the online courses -- - with the following situations: they like this kind of study; they don't like this kind of study or they like depending by the course.

Q4. To specify if the most studied online courses were provided from Romania or from abroad;

Q5. To specify if the most studied online courses were provided by universities or by the business environment.

Q6. To specify if the most studied online courses were in the research domain of their specialization or in other research domains;

Q7. To specify if the most studied online courses were: free, cheap or expensive;

Q8. To specify three aspects that they liked at online courses;

Q9. To specify three aspects that they don't liked at online courses;

Q10. To specify if according to the professional career, they are satisfied or they are not satisfied;

Q11. To specify if, generally, they read: rarely, 1 or 2 books per month, 3 or 4 books per month or more than 4 books per month

Q12. To specify if, generally, they make sport: rarely, 1 or 2 days per week, 3 or 4 days a week or more than 4 days per week.

We have 44 respondents. Depending by the graduation year, we have: 3 respondents from 2005, 4 respondents from 2006, 1 respondents from 2007, 8 respondents from 2008 (4 from them are with 3 years of college studies and 4 from them are with 4 years of college studies), 2 respondents from 2009,

3 respondents from 2010, 2 respondents from 2011, 12 respondents from 2012 and 9 respondents from 2013.

On the number of studied online courses, we have the following results: 11 from respondents have studied 0 online courses; 30 from respondents have studied between 1 and 4 online courses; 2 from respondents have studied between 5 and 10 online courses; 1 from respondents have studied between 20 and 40 online courses. We can observe that the most respondents have studied, in the last two years, between 1 and 4 online courses.

Half from respondents affirm that they like this kind of learning (online courses) and the other half affirm that this depends by the online course.

The studied online courses were provided from Romania in the case of 17 respondents and from abroad for 20 respondents. 7 respondents have studied online courses, in the same manner from Romania as from abroad.

The most studied online courses were provided from universities in the case of 22 respondents and from business environment for 17 respondents. 5 respondents have studied online courses provided, in the same manner by universities as by business environment.

The most studied online courses were from the research domain of their specialization -- in the case of 28 respondents and from other research domains -- for 11 respondents. 5 respondents have studied online courses, in the same manner from the research domain of their specialization as in the other research areas.

33 respondents affirm that the most studied online courses were free. 5 respondents affirm that these were cheap and 2 respondents affirm that these courses were expensive (these courses were provided by a business environment). 4 respondents have studied courses at different prices.

At the eight survey question (specification of three aspects that they liked at online courses) we find nine different categories of aspects:

R8.1) The fact that the courses can be accessed at any time, from anywhere in the world and using different devices - this was the feature most liked by the respondents - 20 respondents;

R8.2) The content of online courses: the information provided and the way used: video, text, images, etc. - 17 respondents;

R8.3) The costs of online courses. We recall here that the big part of respondents have said that their online courses was free - 8 respondents;

R8.4) The possibility to repeat the previous chapters, at any time, during the period of a online course - 6 respondents;

R8.5) The quizes for each chapter - 3 respondents;

R8.6) Friendly interface ease to use - 3 respondents;

R8.7) Saiving time, learning online - 2 respondents;

R8.8) The possibility to participate to a course provided by an university from abroad, where many students around the world are studying now - 2 respondents;

R8.9) Diplomas or certificates are issued - 1 respondent.

At the nine survey question (specification of three aspects that they don't liked at online courses) ,we find ten different categories of aspects:

1) The absence of a teacher - 12 respondents;

2) The content of the course - 8 respondents;

Here, we want to point some observation. Between liked features, we have seen that the course content was one of the most important. In our study, 17 respondents have pointed out that they like the content of studied online courses. In the same time, other eight respondents have said that, in certain cases, they don't like the content of studied online courses;

3) Socializing absence - in different cases, they cannot speak with other course participants. They need to be in a collective of study - 8 respondents;

4) In some cases, the online courses are expensive - 5 respondents;

5) In some cases, the time during an online course is little bit short- 4 respondents;;

6) Generally, employers do not recognize these courses - 3 respondents;

7) In some cases, respondents were not satisfied by the test mode, including also the logistics - 3 respondents;

8) In some cases, the courses are presented in poor formatting text or the writing is too small -2 respondents;

9) Not all online courses are interesting - 1 respondents;

10) It do not exists so much advertising on online courses 1 respondent.

According to the professional career 36 from respondents affirm that they are satisfied and 8 respondents affirm that they are not satisfied.

24 respondents read 1 or 2 books per month. 4 respondents read 3 or 4 books per month. 2 respondents read more than 4 books per month and 14 respondents read less than 1 book per month.

16 respondents make sport 1 or 2 days per week. 7 respondents make sport 3 or 4 days per week. 6 respondents make sport more than 4 days per week and 15 make sport rarely.

In *Table 2* we present (in the case of each college graduation year) the number of online courses studied in the last two years. *Year* refers to the graduation college year; *No OC* represents the number of the studied online courses and *No R* represents the number of respondents.

Year	No OC	No R		Year	No OC	No R
2005	0	1		2010	0	1
2005	1-4	1		2010	1-4	2
2005	5-10	1		2011	1-4	2
2006	0	1		2012	0	2
2006	1-4	3		2012	1-4	9
2007	1-4	1		2012	5-10	1
2008	0	2		2013	0	3
2008	1-4	6		2013	1-4	5
2009	0	1		2013	20-40	1
2009	1-4	1				

Table 2: Number of online courses studied in the last two years

From *Table 2*, we can observe that in almost cases (of college graduation year), we find cases with 0 and cases with 1-4 studied online cases.

Year	Like OC	No R	Year	Like OC	No R
2005	depend	1	2010	depend	2
2005	yes	1	2011	yes	2
2006	depend	2	2012	depend	5
2006	yes	1	2012	yes	5
2007	depend	1	2013	depend	2
2008	depend	3	2013	yes	4
2008	yes	3			
2009	depend	1			

Table 3: Number of respondents which like the online courses (this kind of learning)

In *Table 3* we present (in the case of each college graduation year) the number of respondents which like the online courses (this kind of learning) and the number of respondents which affirm that this depends by the online course.

Year	Country	No R	Year	Country	No R
2005		1	2011	Romania	1
2005	abroad	1	2011	abroad	1
2006	Romania	3	2012		1
2007	Romania	1	2012	Romania	4
2008	Romania	4	2012	abroad	5
2008	abroad	2	2013	Romania	1
2009	abroad	1	2013	abroad	5
2010	abroad	2			

Table 4: The number of respondents according to the provider country

Year	Environment	No R
2005	university	2
2006	business	2
2006	university	1
2007	business	1
2008	business	4
2008	university	2
2009	university	1
2010	university	2
2011	university	2
2012	business	3
2012	university	7
2013	business	4
2013	university	2

Table 5: The number of respondents according to provider activity environment (business or university)

In *Table 4* we can observe the preference for studying online courses from Romania or from abroad. In the case in which for *Country* we have not value, this means that the respondent has studied online courses, with providers from Romania and from abroad.

In *Table 5* we can observe the preference for studying online courses at an university or from business environment.

Year	Specialization	No R
2005	same	2
2006	other	2
2006	same	1
2007	same	1
2008	other	1
2008	same	5
2009	same	1
2010	same	2
2011	same	2
2012	other	5
2012	same	5
2013	other	2
2013	same	4

Table 6: The number of respondents according to the research areas

In *Table 6* we can observe the preference for studying online courses in the same research area as in the college or in other research areas.

Year	B	S	NO R	Year	B	S	NO R
2005	1V2	1V2	1	2010	r	>4	1
2005	1V2	r	1	2010	r	r	1
2005	r	r	1	2011	1V2	1V2	1
2006	1V2	1V2	2	2011	1V2	r	1
2006	1V2	3V4	1	2012	1V2	1V2	3
2006	r	1V2	1	2012	1V2	3V4	1
2007	1V2	1V2	1	2012	1V2	r	2
2008	1V2	3V4	1	2012	3V4	1V2	2
2008	1V2	r	2	2012	3V4	>4	1
2008	3V4	3V4	1	2012	>4	>4	1
2008	>4	3V4	1	2012	r	>4	1
2008	r	1V2	1	2012	r	r	1
2008	r	3V4	1	2013	1V2	1V2	2
2008	r	r	1	2013	1V2	>4	2
2009	1V2	3V4	1	2013	1V2	r	1
2009	r	r	1	2013	r	1V2	2
2010	1V2	r	1	2013	r	r	2

Table 7 Reading and sports as respondent hobbies

In *Tables 3-6* we have considered only the respondents that have studied one or more online courses. In *Table 7* we consider all respondents. In the header of *Table 7*, *B* refers to the number of books that the respondents read per month (we denote with *1V2* the value *1 or 2* and with *r* the value *rarely*). *S* refers to the number of days per week in which the respondents make sport.

We can continue with other example, but we consider that the example presented can conduce to some representative conclusions.

The results of this survey must be considered also during the period of online course. It will be interesting to compare the results at our online course with this initial information. For example, it will be interesting to see if there exists significant difference between the respondents which have *r* at the both hobbies (see *Table 7* - fields *B* and *S*) and the other respondents.

Also, it will be interesting to compare, for each respondent, the response from the queries *Q8*, *Q9* and the results at our online course.

We can formulate many such studies, but we consider only these that are relevant for our business.

V CONCLUSION

When we think of a business, the first thing we must take into consideration is the customer. We know very well that the education of people of any age, nationality, race, etc. will always be one of the most important activities, involving business and activities with development potential.

New technologies used for education open up new business opportunities. The study presented in this paper leads us to draw some of the following conclusions.

Hardware and software resources needed to implement online courses are widespread in the world and mostly very cheap. From a financial standpoint, anyone can start such a business. On the other hand, competition is really strong and has the same kind of technology at their disposal as we do. Equally we have seen that some courses are free (and we will always compete with them).

In order to know the customer and his needs, we must apply different surveys. This will help us to maintain, with the student (our customer), a relationship for a long time.

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