Distance Learning Applied in Primary School Teaching

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Abstract

Nowadays one witnesses a rapid development of technology. Children are more prone to a faster and better acceptance of such a development. Classes must be adapted to meet the current trends and be tailored to the user. In the course of the school year there is a number of periods when pupils are absent from class due to the influenza epidemics. Based on the analysis of attendance at the level of primary and secondary education of students with special needs in the school "Milan Petrović" and the primary school "The First Brigade of Vojvodina" in Novi Sad, a team of experts of various educational profiles, have proposed that the distance learning techniques using electronic learning (E-learning) be introduced into teaching. The procedure was preceded by a survey of pupils and parents. Based on the data collected, the educational software Moodle was selected because of its accessibility and ease of use. In collaboration with the research station "Petnica" Telenor and the town Novi Sad, the Internet portal "Milanče" was created, on which interesting and stimulating lessons and teaching materials intended for children were posted. Student achievement was found to be improved but not all educational materials could be appropriately used in the electronic form.

Key words*: Moodle; special needs; users.*

Introduction

Distance learning or distance education refers to the means of education used when the educator and the educated are physically apart. This type of education was first recorded in 1904 and lasted until World War II at what was then the University College Wales and now is Aberystwyth University (Aberystwyth Prifysgol), founded in 1872, when the Department of the Librarianship College library opened the "correspondence course".

The concept of distance learning has been defined by the United States Distance Learning Association (www.usdla.org) as: "The achievement of knowledge and skills delivered through information and instructions, using different technologies and other forms of distance learning"; i.e. "Distance learning is a system and process of connecting learners with distributed learning resources."

Distance learning is often identified with E-learning and computers. However, it had emerged in England in 1840, even before the first computers were designed. It was the year when Isaac Pitmen (Sir Isaac Pitman, 4. I 1813-12. I 1897), a teacher of shorthand, applied distance learning in his instruction. His students were required to copy short messages from the Bible and send them by mail to the Professor for review. Distance learning (correspondence learning) was associated with the postal system and was intended for those who were not able to attend regular classes and courses. This way of learning was very popular (Sherry, 1996). Advances in technology and the emergence of mass media (radio and TV) allowed for a large positive shift in distance learning (Gone, 1998; Radosav, 2008). The first educational institution which in 1859 officially acknowledged and introduced this kind of education and nearly equalized it with the standard forms of education was the University of London. This example was followed by the University of South Africa, Correspondence Education courses, introduced in 1946, Open University, UK, Distance Education University, since 1969, Fern Universitat in Hagen, Germany, since 1974.

The Internet has provided a different dimension to distance learning, the interactivity and communication between the lecturers and the students, and the availability of the Internet and the number of users has led to an enormous growth of E-learning in all strata of the society (Rumble, 1992). Programmes or distance learning courses can be adapted to the different characteristics of pupils and students of different ages (Alessi, 2000). The main difference between the distance learning programmes are: the technology used, the structure of the programme or course, and the degree of supervision of students. Like all other forms of education distance learning has its advantages and disadvantages (Nikolić, & Ružić-Dimitrijević, 2010).

The Advantages of Distance Learning

The greatest advantage of distance learning is the possibility of permanent learning (lifelong learning) and professional development, independent learning at a personal pace is carried out, at the place and time personally selected. Other advantages of distance learning are: personal pace of advancement, self-selection of the terms to learn, choice of one's own way of learning, active use of modern technology, the location of the participants, and the financial aspect (Dale, 1987, p. 544; Kember & Murphy, 2006). Distance courses allow different degrees of interaction between teachers and students, between students and with each other, using e-mail, teleconferencing or videoconferencing (Smart & Cappel, 2006, pp. 201-219).

Disadvantages of Distance Learning

Distance learners usually emphasize the lack of personal contact between participants as the greatest shortcoming of this type of learning. Because of this isolation of individuals, students need to have a high degree of activity and discipline, in order for them not to drop out (Van der Valle, & Sekušak-Galešev, 2002). One of the problems of distance learning is a very high drop-out rate. The problem is solved by introducing support for students in the person of a tutor or mentor who monitors the students' progress, encourages them in their work, and helps solve any potential problems encountered. One of the disadvantages is the precondition that all students must have at their disposal the appropriate technology: a computer with the latest versions of web browsers, multimedia applications, and the Internet connection. The technology used for a course can be very challenging (for example, videoconferencing) and students who do not have the necessary technology cannot attend the course. A problem for some students as well as tutors is the use of the technologies they are not yet familiar with. Apart from the time needed to master the contents taught, additional time needs to be invested in order to master the technology used to transfer the contents.

Types of Distance Learning

Correspondence courses and independent learning have been used for many years allowing learners to obtain the learning materials by mail. When students master the course content, they send their work by mail to a specific destination. Printed text, materials, audiocassettes, videocassettes, CD-ROMs and increasingly e-mail are used (Mayer, 2003, pp. 125-139; Solaković, 2007). Multimedia Learning. USA: Cambridge University Press. Distance learning courses can be carried out by means of the radio or television programmes transmitted live or previously recorded and prepared. Students who participate in these courses must complete certain tasks in order to receive feedback from their course leaders on the effectiveness with which they have mastered the course and receive a diploma at the end (Savić, 2006). Teleconferencing or videoconferencing allows for the interaction among the participants, and creates the illusion of a real class. Participants discuss and share documents and other materials on their computers (Radosav, 2005). Computers and specialized software developed for the courses which are carried out on computers have been increasingly used in distance learning; for instance CBT (Computer - Based Training), CAI (Computer - Aided Instruction), etc. (Nadrljanski, 2000). Internet services like e-mail, mailing lists, news groups, bulletin boards, chat rooms, serve to improve communication between the participants of distance learning. World Wide Web (www) offers tremendous access to learning materials. The Internet, as the global information network, has become available to millions of people around the globe (Milošević, & Brković, 2005). E-mail is a form of asynchronous communication; it allows communication to be carried out at any time, unlike the telephone or video conferencing, where the participants must be present at the same time (Radmanović, & Vučković, 2006, pp. 125-127).

Moodle, a Specialized Program for Distance Learning

Moodle is an application used for the creation and maintenance of online courses carried out via the Internet. The project is continually evolving with the purpose of supporting the educational environment of the contemporary global society (Cole, & Foster, 2007). The word Moodle is an acronym of the term Modular Object-Oriented Dynamic Learning Environment. It is also a verb that describes the process of light passing through a material (Rice IV, 2006). Moodle is an Open Source project, which means that the user is granted access to the source code, with the ability to change applications and personal customization needs. Moodle is released under the GNU Public License. The application can be downloaded for free from the official Moodle website. Moodle is a web application written in PHP and supports multiple types of databases (especially MySQL and PostgreSQL). The interface has been translated into 65 languages. Moodle is currently used in 163 countries and by about 150 thousand registered users. Users participate actively in the creation of Moodle (Bosnić, 2006). Moodle Resources are all the files, folders and hyperlinks, which consist of simple forms of the educational content which students can use. To add a new resource, one needs to have the authority of the course teachers and should choose a detailed view of the surroundings (the button *Enable changes*). All resources are added in the same way: by choosing different types of resources from the dropdown menu *Add a resource* at the desired location in the logical unit of the course. After the addition is carried out, the resources can be moved if necessary, pulled or hidden away from the course participants (Kalamković, 2004). The tests (*Quizzes*) are very complex activities in the Moodle, as they involve a lot of settings, types of questions, additions and features. All kinds of questions, which can be objectively assessed, are evaluated by Moodle itself. In Moodle it is important to distinguish the concept of the test from the concept of a set of test questions. The questions are created separately from the tests and are not dependent on the test, upon being inserted into the system, the questions are grouped into categories (mostly related to the units) and are later taken from those categories and used for individual tests. This approach has many options, such as the random selection of questions for the test, using the same questions for more tests, etc.

Research

The participants of the survey presented here were students of "The First Brigade of Vojvodina" primary school in Novi Sad, who were the control group of students, and students of "Milan Petrović" primary and secondary school in Novi Sad. As many as 99% of the students in their final year of primary school "The First Brigade of Vojvodina" own a PC and have permanent access to the Internet, as well as the excellent knowledge of the use of personal computers. The website: hemija.wetpaint. com allows parents insight into the students' success in chemistry. By using the appropriate "button", students can find questions and answers for appropriate quiz, they can ask questions and leave their comments on the work of chemistry teachers,

their view on how difficult the quiz was, as well as seek help with any unsolved problems they might have in another school subject.

Research no. 1

Topic: Analysis of how much the students were absent from school
Sample: 25 fifth grade students from "Milan Petrović" school in Novi Sad
Control group: 25 fifth grade students from "The First Brigade of Vojvodina" primary school in Novi Sad
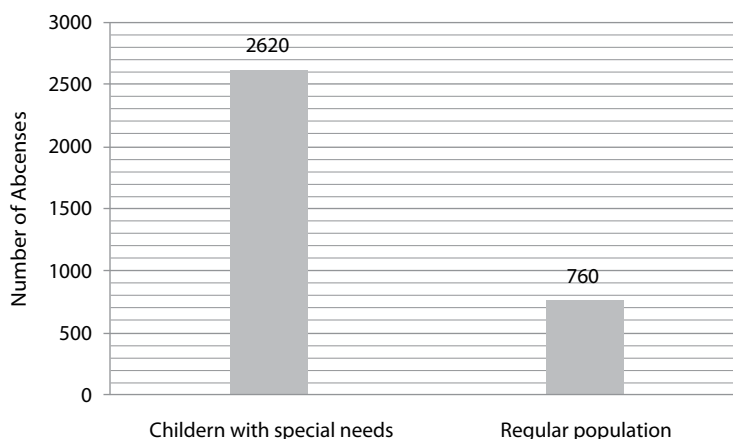Period of observation: one semester

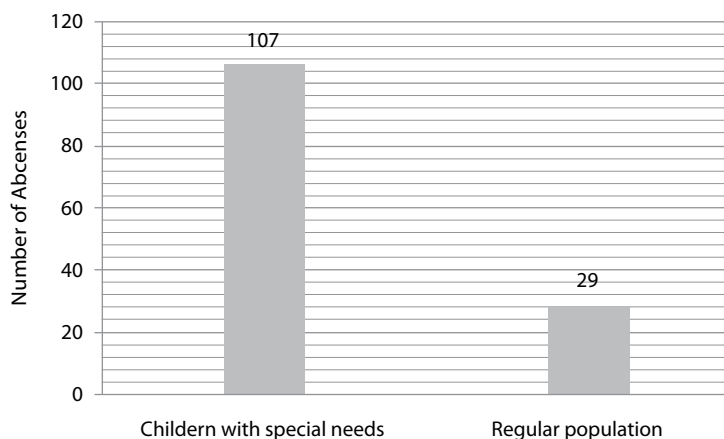**Figure 1.** *Absences from school*

Figure 2. *Absences per student during the observed semester*

* Data for the study have been taken from the grade books

Analysis of Results

It can be concluded that the number of absences of the population of children with special needs is much higher when compared to the children of the same age who attend mainstream schools (Figure 1). If attention is paid to the number of absences per pupil in one school semester (Figure 2), the absence of more than a month of classes is noticed. Due to the large number of absences, chances for optimal monitoring plans and programmes are reduced, thus justifying the portal "Milanče".

Research no. 2

Topic: Analysis of owning and using computers at home
Sample: 46 students with special needs
Test method: Survey

The form of the questionnaire

SURVEY

1. Do you possess a computer in working order at home?
2. Does your child (student at the boarding School for Primary and Secondary Education "Milan Petrović") use a computer?
3. Do you have an Internet connection?
4. How do you access the Internet?
5. Do you think that your computer is sufficiently adjusted for your child to use it successfully for distance learning?

Survey results:

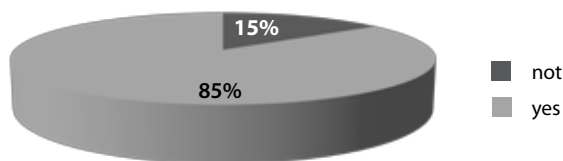1. Do you own a computer in working order at home?

15%

85%

■ not
■ yes

Figure 3. *Owning / lack of computers*

2. Does your child (student at "Milan Petrović" school) use a computer?
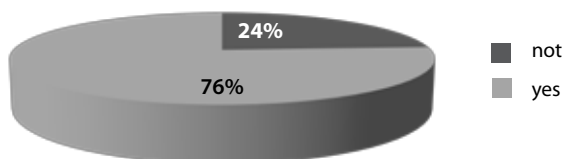

24%

76%

■ not
■ yes

Figure 4. *Use / non-use of the computer*

Survey Analysis

The aim of the survey was to determine the possibility of carrying out distance learning. The results indicate the existence of technical possibilities (see *Figures 3* and *4*). Several families, after getting acquainted with the advantages of distance learning programs and Moodle, decided to purchase a computer. A partial problem of adapting the computer and the mouse for the children with cerebral palsy was identified. The school purchased several sets of special keyboard and mouse sets tailored for such customers.

Research no. 3

Topic: Analysis of the performance of students before and during the use of the portal for distance learning

Sample: 28 students of the fifth and sixth grades of "Milan Petrović" school in Novi Sad

Period of observation: one school year (in the first half of this period Moodle was not used; it was used in the second period).
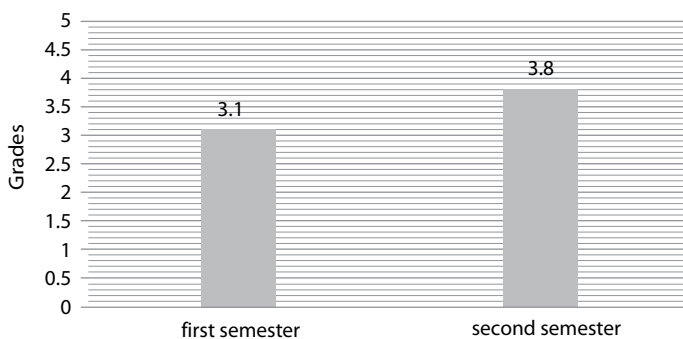
Analysis of success per school subject:
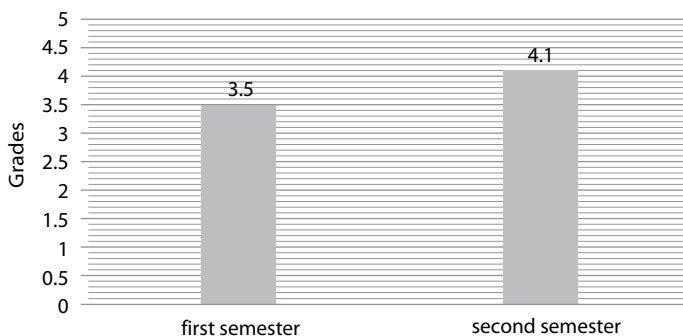

Figure 5. *Success in Mathematics*

Figure 6. *Success in Serbi*
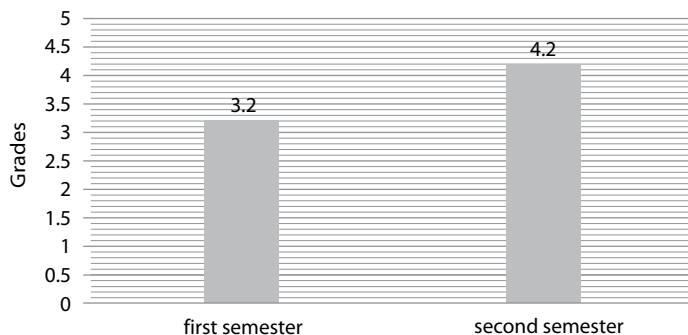
Figure 7. *Success in Science*

Summarized results

Note: *Figure 8* shows differences in the grades per subject between the first and the second semesters, i.e. without the use of distance learning and with the use of distance learning.
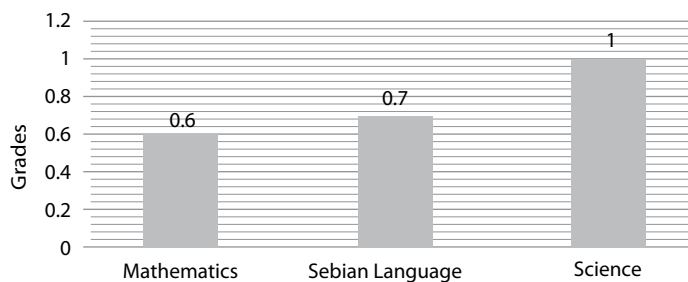

Figure 8. *Difference in scores between the first and the second semesters*
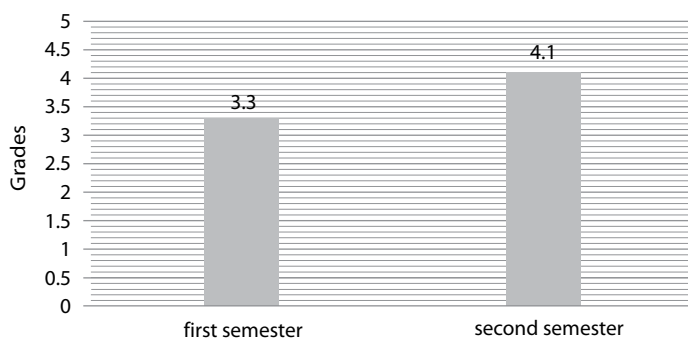
The Achieved Average

Figure 9. *Grade average*

Currently, the portal contains educational materials for the fifth and sixth grades of primary school. The plan is to include the other classes as well due to the popularity of the website. The programme contents of the grades five and six of the special curriculum coincide with the programme contents of the grades three and four of the regular programme. Several presentations of the educational portal for distance learning have been organized at the learning aids fair in Belgrade and the "Vidovdan Days of the Diaspora" at the Sava Centre. There has been an extremely large number of visitors, over 1,000 a day, from all parts of the world, which shows that this method of education has a good potential, as a regular and supplementary form of education.

Discussion of Results Analysis

The analysis of achievements has shown the benefits of distance learning. The portal contains educational materials in three school subjects (mathematics, the Serbian language, science), so the analysis was related to these three subjects. School success, i.e. the grades in the course of one school year, have been analyzed. In the first semester the portal for distance learning did not function and students could not learn from home; in the second semester this was possible. It is important to notice the improvements of the achievements of the users. The best results have been achieved in science (*Figure* 7). The least improvement was achieved in mathematics (*Figure* 5). The data show which subjects and teaching materials are best suited for distance learning and allow the use of creativity and multimedia contents. Mathematics is a subject which requires the presence of an instructor who can present the teaching materials to students in the real-time and solve all the problems as they occur. Science allows the developers of on-line courses to include a multitude of films, animations and graphics in their lessons which vividly explain the course content and reduce the need for teachers.

From the above mentioned, it can be concluded that there are more or less suitable educational materials for on-line learning, but in any case, when a student is unable to attend regular classes, every form of acquiring knowledge is good.

The analysis of the grade average has shown that there has been significant improvement in school success (see *Figures 8* and *9*). Having spoken to the students we have found that they visit the portal for distance learning frequently, especially when they are unable to attend classes. One reason for this is the form of the course because when the Moodle teaching materials were created, care was taken not to simply copy the course book materials. The aim was to exploit all the possibilities of Moodle and to create courses which abound in multimedia and interactive contents, with the purpose of animating the course participants.

Conclusion

Most people have heard about the possibilities of online education. The school "Milan Petrović" has been organizing on-line courses, as a supplement to regular

education. This research has proven that there are numerous advantages of the presented approach. A great improvement in school success has been achieved, thanks to the great effort of a group of teachers who have realized this programme. Classical educational methods have significant drawbacks, e.g. the necessity to attend classes physically and the fact that the classes are tailored to the average student. With the expansion of the use of computers and the Internet, new techniques have been developed, E-Education and E-Learning, and these problems have been successfully overcome.

The benefits of distance learning have thus been confirmed, but this kind of work cannot replace the "live word" of the speaker and the personal contact that is accomplished in the regular classroom. The next two steps to be undertaken in the process of upgrading distance learning are: to organize video conferencing and to enable the transmission hours to run in real time. Everything is done in order to ensure an inclusive process for children with special needs. The problems of isolation can be successfully solved in this way and these children can engage in the educational process. From the collaboration with the Centres for Social Work throughout Serbia, data have been obtained showing that a large number of children, mostly in rural areas, are left outside of the educational system, because of the reduced mobility and the lack of transportation. The purchase of computers and training students to work on them could get these children involved in the teaching process. The biggest obstacles to the implementation of this programme are: the lack of material resources, the lack of educated teachers, and the prejudice about children with special needs. The solution to most of these problems would be to conduct a comprehensive campaign, which would present to the public all the problems and opportunities of children with special needs as well as the way to resolve them.

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Učenje na daljinu primijenjeno u nastavi osnovne škole

Sažetak

Sadašnje je vrijeme vrijeme naglog razvoja tehnike i tehnologije. Djeca su sklonija bržem i boljem prihvaćaju takvog razvoja. Nastava se mora prilagoditi suvremenim trendovima i biti prilagođena korisniku. Tijekom školske godine postoje periodi većeg broja izostanaka, npr. uslijed epidemija gripe. Analizom situacije u vezi s pohađanjem nastave, na razini osnovnog i srednjeg obrazovanja učenika s posebnim potrebama u ŠOSO „Milan Petrović" i OŠ „Prva vojvođanska brigada" u Novom Sadu, tim stručnjaka raznih obrazovnih profila predložio je uvođenje učenja na daljinu uporabom tehnike elektroničkog učenja (E-learning). Postupku je prethodilo anketiranje učenika i roditelja. Na temelju prikupljenih podataka odabran je obrazovni softver Moodle, zbog pristupačnosti i jednostavnosti za uporabu. U suradnji s Istraživačkom stanicom „Petnica", Telenorom i Gradom Novim Sadom nastao je internetski portal „Milanče", na kome su zanimljive i stimulativne lekcije i nastavni materijal namijenjeni učenicima. Analizom postignuća učenika utvrđeno je da se uspjeh učenika poboljšao, ali i da nisu svi nastavni sadržaji podjednako podobni za prebacivanje u elektronički oblik.

Ključne riječi: *korisnici; Moodle; posebne potrebe*

Uvod

Učenje na daljinu

Učenje na daljinu (*Distance Learning*, *Distance Education*) omogućuje educiranje na način da su edukator i educirani fizički međusobno udaljeni. Takav način obrazovanja prvi put je zabilježen 1904. i trajao je do II. svjetskog rata na *University Collage Wales*, na današnjem *Aberystwyth University, Prifysgol Aberystwyth*, osnovanom 1872, kada je na Odsjeku knjižničarstva *College of Librarianship* otvoren „Dopisni tečaj".

Pojam učenja na daljinu, američka asocijacija za učenje na daljinu *The United States Distance Learning Association*, www.usdla.org definira kao: „Postizanje znanja i vještina kroz dostavljene informacije i upute, primjenom različitih tehnologija i ostalih oblika učenja na daljinu", tj.: „Obrazovanje na daljinu je sustav i proces povezivanja polaznika s distribuiranim obrazovnim resursima."

Učenje na daljinu često poistovjećuju s *E-learning* i računalima. Učenje na daljinu pojavilo se i prije pojave prvih računala, u Engleskoj 1840, kada je *Sir Isaac Pitman* (4. I. 1813.-12. I. 1897.), učitelj stenografije, primijenio učenje na daljinu u radu sa svojim studentima. Studenti su prepisivali kratke poruke iz Biblije i poštom ih slali profesoru na pregled. Učenje na daljinu (*Correspondence Learning*) bilo je povezano s poštanskim sustavom i bilo je namijenjeno onima koji nisu mogli redovito pratiti nastavu i tečajeve. Takav način učenja bio je vrlo popularan (Sherry, 1996). Napretkom tehnologije i pojavom masovnih medija (radio i TV) i učenje na daljinu ostvarilo je velik pozitivan pomak (Gone, 1998; Radosav, 2008). Prva obrazovna institucija u kojoj je 1859. takav način edukacije polaznika postao služben i gotovo izjednačen sa standardnim oblicima obrazovanja je Sveučilište u Londonu. Sljedeće su: Sveučilište u Južnoj Africi, *Correspondence Education*, tečajeve uveo 1946, *Open University* u Velikoj Britaniji, *Distance Education University*, od 1969, *Fern Universitat* u Hagenu, Njemačka, od 1974. godine.

Internet je omogućio drugačiju dimenziju učenju na daljinu, interaktivnost i komunikaciju između predavača i učenika, a dostupnost interneta i broj korisnika doveli su do golemog porasta korisnika *E-learning* u svim slojevima društva (Rumble, 1992). Programi ili tečajevi učenja na daljinu mogu biti prilagođeni različitim osobinama učenika i različitom uzrastu učenika (Alesso, 2000). Glavne razlike između programa učenja na daljinu su u: tehnologiji koja se koristi, strukturi programa ili tečaja, stupnju nadgledanja polaznika. Kao i svi ostali oblici edukacije i učenje na daljinu ima svojih prednosti i mana (Nikolić, Ružić-Dimitrijević, 2010).

Prednosti učenja na daljinu

Najveća prednost učenja na daljinu je mogućnost stalnog učenja (*lifelong learning*) i profesionalnog usavršavanja, *učenje je neovisno*, provodi se osobnim tempom, na osobno odabranom mjestu i vremenu. Prednosti učenja na daljinu su: *osobni tempo napredovanja*, *samostalan odabir termina za učenje*, *odabir svog načina učenja*, *aktivno korištenje suvremenih tehnologija*, *lokacija polaznika*, *financijski aspekt* (Dale, 1987, 544, Kember & Murphy, 2006). Tečajevi na daljinu omogućuju različite stupnjeve interakcije između učitelja i učenika, te međusobno između učenika, uz korištenje *e-maila*, telekonferencije ili videokonferencije (Smart & Cappel, 2006, 201-219).

Nedostaci učenja na daljinu

Polaznici tečajeva na daljinu najčešće, kao najveći nedostatak, naglašavaju *izostanak osobnog kontakta među sudionicima*. Zbog takve izoliranosti pojedinaca potreban je visok stupanj aktivnosti i discipliniranosti polaznika, kako ne bi odustali od pohađanja tečaja (Van der Valle, Sekušak-Galešev, 2002). Jedan od problema kod učenja na daljinu je upravo *visok stupanj odustajanja polaznika* (*high dropout rate*). Problem se rješava uvođenjem podrške polaznicima putem tutora ili mentora, koji prati napredovanje polaznika, potiče ga u radu te mu pomaže pri eventualnim problemima s kojima se susreće. Nedostaci su što svi polaznici moraju na raspolaganju imati odgovarajuću tehnologiju: računalo s najnovijom verzijom web Browsera, programe za multimediju, priključak na internet. *Tehnologija koja se koristi za neki tečaj može biti i vrlo zahtjevna*

(primjerice kod videokonferencija), pa tečaj ne mogu pohađati polaznici kojima ona nije dostupna. Problem za neke polaznike, pa i tutore, predstavlja *korištenje tehnologije koju još ne poznaju*. Potrebno je ulagati dodatno vrijeme da bi se, uz sadržaj koji se uči, savladala i tehnologija s pomoću koje se sadržaji prenose polaznicima.

Vrste učenja na daljinu

Dopisni tečajevi i samostalno učenje koriste se već godinama i omogućuju dobivanje materijala za učenje putem pošte. Kada učenici savladaju sadržaj tečaja, rezultate zadataka poštom šalju na određeno mjesto. Koriste se tiskani, tekstualni materijali, audiokasete, videokasete, CD-ROM-ovi i sve češće *e-mail* (Mayer, 2003). Učenje na daljinu može se ostvariti tečajevima na kojima se preko *radijskog ili televizijskog programa* prenose predavanja uživo ili snimljene emisije. Učenici koji sudjeluju u takvim tečajevima moraju ispuniti određene zadatke, pa od voditelja tečaja dobivaju povratnu informaciju o uspješnosti kojom su savladali tečaj i na kraju dobivaju diplomu (Savić, 2006). *Telekonferencije*, tj. videokonferencije, omogućuju interakciju među sudionicima, pa se stvara iluzija stvarnog razreda. Sudionici raspravljaju i razmjenjuju dokumente i ostale materijale na računalu (Radosav, 2005). Za učenje na daljinu se sve više koriste *računala*, odnosno specijalizirani programi razvijeni za tečaj na računalima, kao što su: CBT (*Computer - Based Training*), CAI (*Computer - Aided Instruction*), itd. (Nadrljanski, 2000). *Internetski servisi* poput: *e-mail*, poštanske liste, novinske grupe, Bulletin Boards, Chat Rooms služe za poboljšanje komunikacije između sudionika učenja na daljinu. World Wide Web (WWW) nudi golemu mogućnost pristupa materijalima za učenje. Internet je, kao globalna informacijska mreža, postao dostupan milijunima ljudi diljem planeta (Milošević, Brković, 2005). *E-mail* je oblik asinkrone komunikacije, omogućuje komunikaciju u bilo koje vrijeme, za razliku od telefona ili videokonferencije, gdje sudionici moraju biti prisutni istodobno (Radmanović, Vučković, 2006, 125-127).

Moodle, specijalizirani program za učenje na daljinu

Moodle je aplikacija za izradu i održavanje *online* tečajeva putem interneta. Projekt se kontinuirano razvija s ciljem potpore obrazovnom okruženju suvremenoga globalnog društva (Cole & Foster, 2007). Riječ *Moodle* akronim je izraza Modularno objektno-orijentirano dinamičko obrazovno okruženje (*Modular Object-Oriented Dynamic Learning Environment*). To je i glagol koji opisuje proces laganog prolaska kroz neku tvar (Rice IV, 2006). Moodle je projekt otvorenog koda (*Open source*), što znači da je korisnicima omogućen uvid u izvorni kôd, uz mogućnost promjene aplikacije i prilagodbe osobnim potrebama. Moodle je izdan pod licencom GNU Public License. Aplikacija se može besplatno preuzeti sa službene Moodle mrežne stranice. Moodle je web aplikacija napisana u PHP-u, a podržava više vrsta baza podataka (posebno MySQL i PostgreSQL). Sučelje je prevedeno na 65 jezika, a Moodle trenutno u 163 zemalje koristi oko 150 tisuća registriranih korisnika. Korisnici aktivno sudjeluju u stvaranju Moodlea (Bosnić, 2006). Važne mogućnosti Moodlea su: izrada velikog

broja tečajeva u okviru jednog sustava; planiranje tečajeva - raspored aktivnosti, kalendar; upravljanje korisnicima, korisničkim ulogama i grupama korisnika na tečaju; rad s već postojećim datotekama i obrazovnim sadržajima; provjera znanja i ocjenjivanje korisnika; praćenje aktivnosti korisnika; mnogobrojni alati za komunikaciju i kolaboraciju među korisnicima; upravljanje sustavom - sigurnosne kopije, statistike, logovi; opsežan sustav pomoći. Resursi Moodlea su sve datoteke, mape i hiperlinkovi, koji čine jednostavne oblike obrazovnog sadržaja koje polaznici mogu upotrebljavati. Za dodavanje novog resursa potrebno je imati ovlasti nastavnika na tečaju i odabrati detaljni prikaz okruženja (*Omogući izmjene*). Svi se resursi dodaju na isti način: odabirom vrste resursa iz padajućeg izbornika *Dodaj resurs* na željenom mjestu u logičkim cjelinama tečaja. Nakon dodavanja, resursi se po potrebi mogu premještati, uvlačiti i sakrivati od polaznika (Kalamković, 2004). Testovi (*Quizzes*) su vrlo kompleksna aktivnost u Moodlu, s puno postavki, vrsta pitanja, dodataka i mogućnosti. Sve vrste pitanja, koje se mogu objektivno ocijeniti, ocjenjuje sam Moodle. U Moodlu je važno razlikovati pojam testa od pojma skupa pitanja. Pitanja se stvaraju odvojeno od testova i nisu ovisna o testu. Prilikom unosa pitanja se grupiraju u kategorije (najčešće vezane uz cjeline), a kasnije se iz kategorija pitanja uzimaju za pojedinačni test. Takav pristup donosi više mogućnosti, poput slučajnog odabira pitanja za test, korištenja istog pitanja u više testova i slično.

Istraživački dio

Istraživanjem su obuhvaćeni učenici OŠ „I vojvođanska brigada" - Novi Sad, kao kontrolna skupina i učenici ŠOSO „Milan Petrović" - Novi Sad. Osobno računalo posjeduje 99% učenika VII. i VIII. razreda OŠ „I vojvođanska brigada" i imaju stalni pristup internetu, kao i zavidno znanje u korištenju osobnih računala. Sajt: hemija. wetpaint.com omogućuje roditeljima uvid u uspjeh učenika iz kemije. Korištenjem odgovarajućeg "gumba", učenici mogu saznati pitanja i odgovore za odgovarajući kontrolni, mogu postaviti pitanja, ostaviti komentare o radu nastavnika kemije, mišljenje koliko je kontrolni bio težak, ali i zatražiti pomoć u vezi s nerješivim problemom iz nekog drugog predmeta.

Istraživanje br. 1

Tema: Analiza broja izostanaka s nastave
Uzorak: 25 učenika V. razreda ŠOSO „Milan Petrović" - Novi Sad
Kontrolna grupa: 25 učenika V. razreda OŠ „I vojvođanska brigada" - Novi Sad
Razdoblje promatranja: jedno školsko polugodište

Grafikon 1. i 2.

* Podaci za istraživanje preuzeti iz školskih dnevnika

Analiza rezultata:

Može se zaključuje da je broj izostanaka populacije djece s posebnim potrebama mnogo veći u usporedbi s djecom istog uzrasta iz redovne škole (*Grafikon 1*). Ako se

obrati pažnja na broj izostanaka po jednom učeniku, u jednom školskom polugodištu (*Grafikon 2*) se uočava izostajanje više od mjesec dana s nastave. Zbog velikog broja izostanaka smanjuje se mogućnost optimalnog praćenja plana i programa, pa je portal „Milanče" opravdan.

Istraživanje br. 2

Tema: Analiza posjedovanja i uporabe računala kod kuće
Uzorak: 46 učenika s posebnim potrebama
Metoda ispitivanja: Anketa
Izgled anketnog listića

Rezultati ankete:
Posjedujete li kod kuće računalo u funkcionalnom stanju?

Grafikon 3.

Koristi li vaše dijete (učenik ŠOSO „Milan Petrović") računalo?

Grafikon 4.

Analiza ankete:
Cilj provođenja ankete bio je utvrditi mogućnosti organiziranja učenja na daljinu. Rezultati pokazuju postojanje tehničkih mogućnosti (*Grafikoni 3 i 4*). Nekoliko obitelji je nakon upoznavanja s prednostima učenja na daljinu i programa Moodle odlučilo nabaviti računalo. Djelomičan problem bio je adaptiranje računala i klasičnog miša djeci s cerebralnom paralizom. Škola je kupila nekoliko kompleta specijalnih miševa i tipkovnica koji su namijenjeni tim korisnicima.

Istraživanje br. 3

Tema: Analiza uspjeha učenika prije i za vrijeme korištenja portala za učenje na daljinu
Uzorak: 28 učenika V. i VI. razreda ŠOSO „Milan Petrović" - Novi Sad
Razdoblje promatranja: jedna školska godina (u I. polugodištu nije korišten Moodle, u II. jest).

Analiza uspjeha po predmetima:

Grafikon 5., 6. i 7.

Zbirni rezultati:
Napomena: *Grafikon 8* pokazuje razliku ocjena po predmetima između I. i II. polugodišta, tj.bez upotrebe učenja na daljinu i s upotrebom učenja na daljinu.

Grafikon 8.

Ostvaren prosjek

Grafikon 9.

Trenutno su na portalu nastavni sadržaji za V. i VI. razred osnovne škole. U planu je obuhvaćanje i ostalih razreda zbog velike posjećenosti internetske stranice. Programski sadržaji V. i VI. razreda specijalnog plana i programa poklapaju se s programskim sadržajima III. i IV. razreda redovnog programa. Organizirano je nekoliko promocija obrazovnog portala za učenje na daljinu, na sajmu učila u Beogradu i „Vidovdanskim danima dijaspore" u Sava centru. Primijećen je ekstremno velik broj posjeta, više od 1000 dnevno, iz svih dijelova svijeta, što govori u prilog činjenici da takav način obrazovanja ima potencijala, kao redovan i dopunski blik obrazovanja.

Analiza rezultata

Analizom postignuća učenika uočavaju se koristi učenja na daljinu. Na portalu se nalazi nastavni materijal iz tri područja (matematika, srpski jezik i priroda i društvo), pa se analiza odnosila na ta tri predmeta. Analiziran je uspjeh, tj. analizirane su ocjene tijekom jedne školske godine. U I. polugodištu portal za učenje na daljinu nije radio i učenici nisu mogli učiti od kuće, a u II. polugodištu je to bilo moguće. Bitno je uočiti poboljšanje postignuća korisnika. Najbolji rezultati su za predmet priroda i društvo (*Grafikon 7*). Najmanje poboljšanje ostvareno je iz matematike (*Grafikon 5*). Iz prethodnog se može vidjeti koji su predmeti i nastavni sadržaji najpogodniji za učenje na daljinu i omogućuju kreativnost i upotrebu multimedijskih sadržaja. Matematika je predmet koji zahtijeva prisustvo „živog" predavača, koji će u realnom vremenu prezentirati učenicima nastavni materijal i „u hodu" rješavati sve nedumice. Priroda i društvo omogućuje kreatorima *on-line tečajeva* da u lekcije ubace mnoštvo filmova, animacija i slika, koje slikovito objašnjavaju nastavni sadržaj i smanjuju potrebu za predavačem.

Iz svega navedenog dolazi se do zaključka da postoje više ili manje pogodni nastavni sadržaji za *on-line* učenje, ali kada učenik ne može prisustvovati redovnoj nastavi, svaki je oblik stjecanja znanja dobar.

Analizom zbirnog prosjeka ocjena utvrđeno je da postoji znatno poboljšanje (*Grafikoni 8 i 9*). Razgovorom s učenicima došlo se do spoznaje da učenici rado posjećuju portal za učenje na daljinu, posebno kada ne mogu prisustvovati nastavi. Jedan od razloga je oblik tečaja, jer se pri izradi tečaja vodi računa o tome da se ne vrši jednostavno kopiranje nastavnih sadržaja iz udžbenika. Cilj je bio iskoristiti sve mogućnosti Moodle-a i kreiranje tečajeva koji obiluju multimedijalnim i interaktivnim sadržajima, a sve u cilju animiranja polaznika.

Zaključak

Većina ljudi je čula za mogućnosti *on-line* obrazovanja. U ŠOSO „Milan Petrović" organizirani su *on-line* tečajevi kao dopuna redovnom obrazovanju. Istraživanjem je dokazano da postoje mnogobrojne prednosti takvog oblika rada. Ostvareno je bitno poboljšanje uspjeha, uz veliki trud skupine nastavnika koji su realizirali ovaj program. Obrazovanje klasičnim metodama ima značajne nedostatke, neophodnost

prisustvovanja mjestu odvijanja nastave, nastava je prilagođena prosječnom učeniku. Širenjem primjene računala i interneta razvijene su nove tehnike obrazovanja, e-obrazovanje (E-Education ili E-Learning) i navedeni problemi se uspješno rješavaju.

Sve navedeno govori nam o prednostima učenja na daljinu, ali takav oblik rada ne može zamijeniti „živu riječ" predavača i osobni kontakt koji se ostvaruje u redovnoj nastavi. Sljedeći koraci u nadogradnji procesa učenja na daljinu bili bi: organiziranje video konferencija; prijenos satova u realnom vremenu. Sve se radi u cilju omogućavanja inkluzivnog procesa djece s posebnim potrebama. Problemi izoliranosti bi na taj način bili uspješno prevladani i takva djeca bi se mogla uključiti u nastavni proces. U suradnji s centrima za socijalni rad diljem Srbije dolazi se do podataka da je velik broj djece, najviše u seoskim sredinama, izvan sustava obrazovanja, upravo zbog smanjenja pokretnine i nemogućnosti transporta. Nabavom računala i obukom za rad na njima ta bi djeca mogla biti uključena u nastavni proces. Najveće prepreke u provođenju tog programa jesu: nedostatak materijalnih sredstava; manjak obrazovanog nastavnog kadra; predrasude o djeci s posebnim potrebama. Rješenje većine tih problema bilo bi provođenje sveobuhvatne kampanje koja bi javnosti približila sve probleme i mogućnosti djece s posebnim potrebama i ukazala na pravce njihova rješavanja.