Bridging the Generation Gap in ICT Education

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Abstract. The main objective of this chapter is to describe the educational needs of modern students as representatives of the Net generation. We highlight the discrepancy between their characteristics and the traditional ways of teaching ICT disciplines. In this chapter we report our teaching experience and poll results at Kherson State University, Ukraine for three year period. We offer new teaching approaches to cope with the generation gap and ways to improve the quality of ICT teaching.

Keywords: Generation gap, Generation Net, teaching approaches, ICT discipline.

1   Introduction

The UNESCO report on Information Technology in Education [1] informs that Ukraine is on the way of "the rapid advancement of ICT in education that leads to constant updating of educational content and quality of ICT training". However, there are still many problems remain. Mainly, they are connected with the fact that teachers and their educational institutions are having hard time to make a transition to information society: "increased demands for flexibility, mobility and adaptability to the education management system, educational institutions and teachers in the context of rapid changes make it difficult to maintain and improve the quality of educational services."

2   Related Work

The general trends of students' learning style and their behavior that were identified by our previous teaching experience and investigations on digital competence formation among future teachers have resulted in further research [17]. We attempted to find out the unknown factor that has significant impact on pedagogical process. We tried to understand the nature of this phenomenon by considering modern students as the representatives of a new generation.

To date, about 40 books and scores of articles and chapters have been written on this generation that report the results of international surveys and other research and describe new gens' characteristics. Their impact itself on education at all levels has been interesting to researchers and educators too. There are about 10 terms to describe the current generation of students: Millennials (Howe and Strauss), Generation Y or Gen Y (Nader), Echo Boomers (Tapscott), Net Generation (Tapscott), Digital Aboriginals (Tarlow and Tarlow), Digital Natives (Prensky), Nexters (Raines, and Filipczak), Dot.Com Generation (Stein & Craig) [2].

The representatives of this generation are middle and high school students, college students, and posdocs. Roughly all young people in education born between 1982 and 2003. They have grown up in the world of high-tech, digital and mobile technologies, and used to be online 24/7.

The burgeoning technology itself has had a profound effect on this generation, unlike any previous one. In the classroom, they can chat on Skype or write SMS to their friends, take notes on Ipad, surf the Internet and read a book on ReadBook. This behavior cannot be fully appreciated by their teachers: it's considered that electronic instruments and digital devices distract students from the "real" study [2]. Most of today's teachers are representatives of the earlier generations. They use teaching methods and learning models that best fit them but not newcomers.

It was found that a representative of new generation inherent a range of characteristics that are defined a predisposition for becoming a successful educator [15]. They have potential, strong motivation and desire to make their society a better place. Some researches study and develop strategies for retention them in definite professional sphere including Education.

Moreover, the representatives of Net generation have solid moral values connected with a family and society as a whole. They are highly motivated to form open and tolerant society. It's important for new gens' educators to consolidate and maintain youths' system of values [15].

The results of the 3rd year students' polling showed the low level of professional awareness (Preschool and Elementary School faculty). Only 50% students have an intention to become teachers [16]. The absent of professional focus among students sets an important task for educators to make seeing themselves in teaching profession.

Among the characteristics of generation should be noted that new Gen workers are usually educationally focused and attribute their success to their educational capabilities, want to have a career promotion and a flexible work schedule, disregard the dress code, demand ICT equipped workplace.

Ronald A. Berk synthesized research evidence based on ten national and international surveys: EDUCAUSE [4], College Students' Perceptions of Libraries and Information Resources Survey, Greenberg Millennials Study [5], Education Research Institute (UCLA) [3] American Freshman Survey [11], National Center for Education Statistics [9], Net Generation Survey [8], The Net Generation: A Strategic Investigation [13], Nielsen Net View Audience Measurement Survey [2, 10], Pew Internet and American Life Project [6, 7] and Technological preparedness among entering freshman [12]. The research results from the surveys and aforementioned books have yielded twenty learner characteristics typical for most Net Geners: technology savvy, relaying on search engines for information, interested in multimedia, creation Internet content, operating at twitch speed, learning by inductive discovery, learning by trial and error, multitask on everything, short attention span, visual communication, craving social face-to-face interaction, emotionally open, embracing diversity and multiculturalism, preferring teamwork and collaboration, striving for lifestyle fit, feeling pressure to succeed, constantly seeking feedback, thriving on instant gratification, responding quickly and expecting rapid responses in return, preferring to type.

We have identified some teaching approaches that are contradictory to the contemporary students' needs. This gap is especially obvious in teaching computer
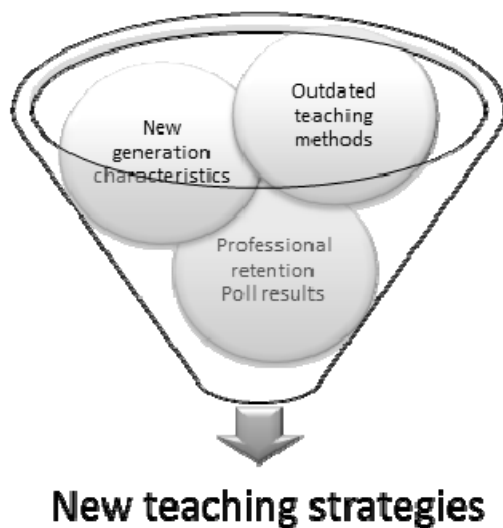
Fig. 1. Up-grading discipline background

disciplines. Complete comprehensive step-by-step instructions and exclusively individual learning are no longer efficient. This context led the authors of this chapter to a revision of present teaching strategies.

3 Setting Up the Pedagogical Experiment

The only discipline that is offered at Kherson State University and focuses on developing of ICT skills for future teachers of all specialties is "New Information Technologies and Technical Facilities of Education". This year the discipline was renamed in "Information Technology" in most curricula.

The pedagogical experience of teaching the discipline "New Information Technologies and Technical Facilities of Education" in 2011 (109 students) and in 2012 (112 students) at Faculty of Pre-School and Elementary Education (FPEE) and results of polling students from different departments allowed us to identify problems that are mainly related to the mentioned disparity [17].

The poll of 60 students of non-computer (Faculty of Foreign Philology and Translation) and computer specialties (Faculty of Mathematics, Physics and Informatics) showed high level of access to ICT of Net Gens at Kherson State University. Most of obtained results are correlated not only among groups of computer and non-computer specialties, but also to the trend of global statistics.

100% of the respondents have their own laptop, Ipad or desktop, a mobile phone or a similar device. 84% of students have started using the computer for learning for 7 years or more. 29% of students spend 5-7 hours a day and 7% - more than 8 hours on the Internet on a weekday and only 1-2 hours with benefit. 84% of students spend more time online at weekends. Usually students spend about 2 hours a day speaking by telephone and at least 1-2 hours communicating through the Net.
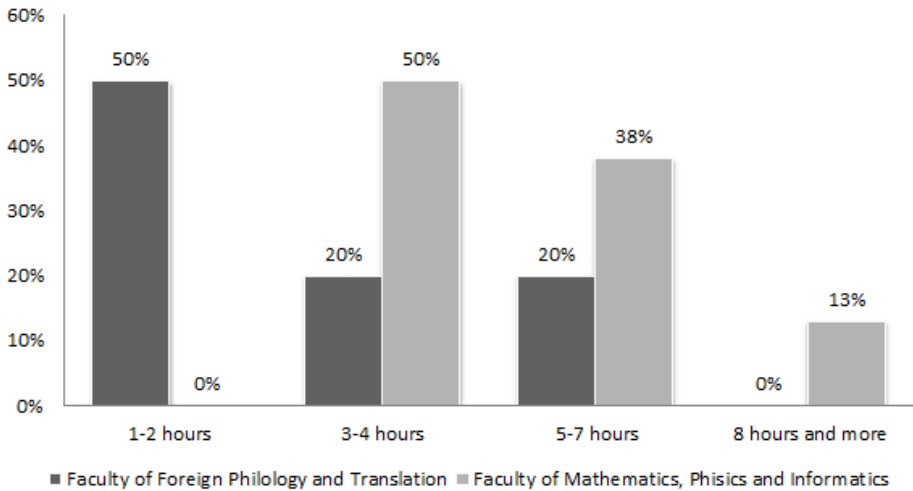
Fig. 2. Students usually spend at the computer on a weekday

Students use computer mainly for learning – 25.5%, entertainment (watching movies, playing games) – 21.5%, communication (social nets, chats, forums, instant messengers, etc.) – 18.5%, personal development (taking courses, reading books out of an academic program, etc.) – 14%, creativity (writing music, making video, etc.) – 13%, other purpose – 8.5 %.
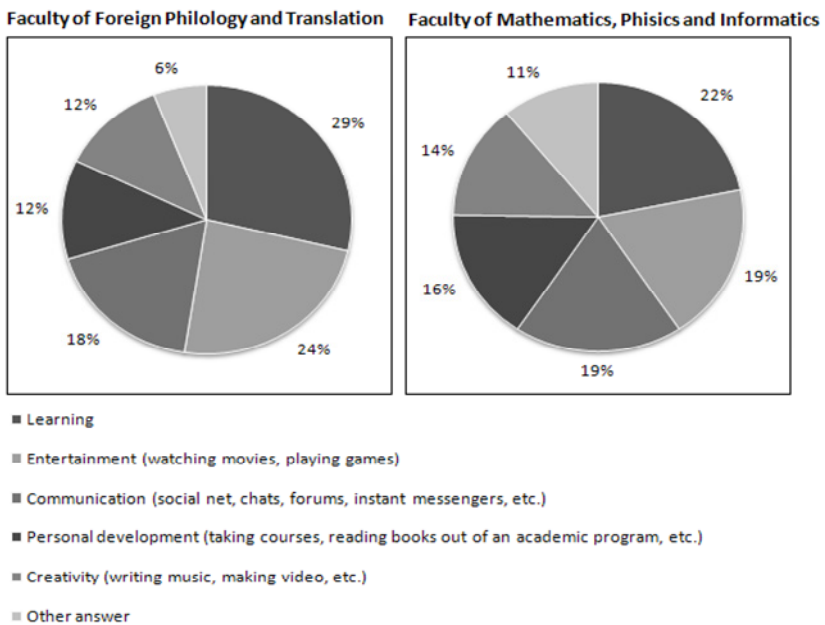

Fig. 3. Main objectives for using computer and the Internet by students

26% of students mentioned search engines as the most frequently used site on the Internet, 19% - social networks, wiki sites, 7.5% - forums, 8.5% - sites with ready-made home tasks, 7.5%, - educational portals, 7.5%, - e-mail and 1.5% - e-Library.

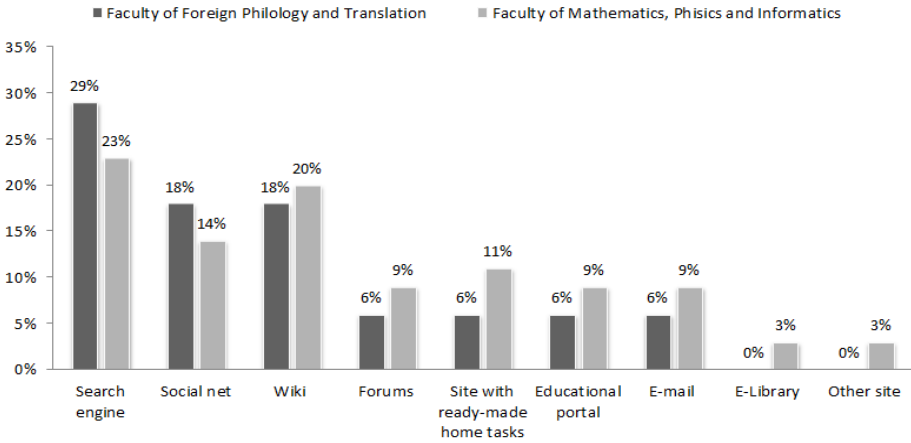**Fig. 4.** The most frequently visited sites by students

Among the typical learning tasks at university that are associated with the use of ICT, students noted the following: searching information - 26%, writing reports - 17.5%, making multimedia presentations - 15.5%, translating text - 14.5%, filling tables and forms - 12%, watching movies - 8%, other - 6.5%.
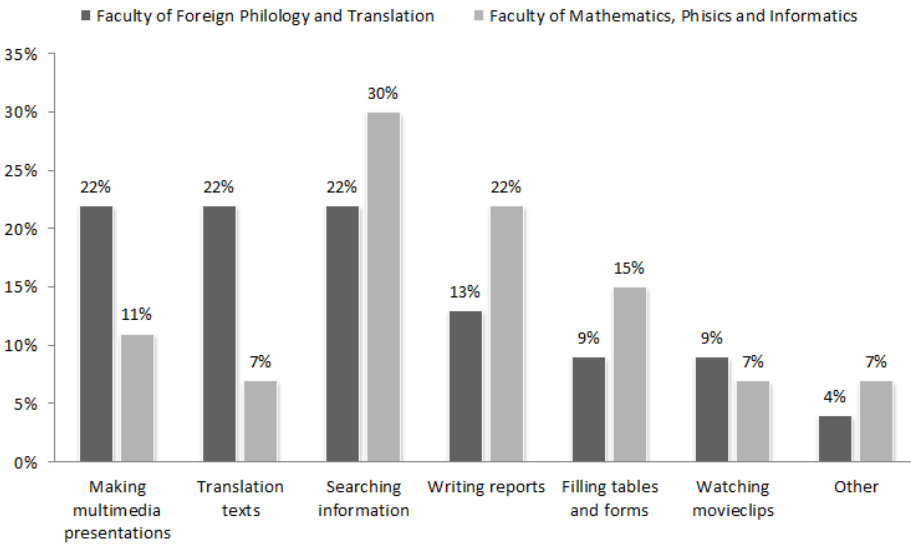
Fig. 5. Typical learning tasks in ICT use

Thus, the poll results indicate that the students at Kherson State University refers to a group of people with a high level access to ICT and inherent essential characteristics of the new generation.

Therefore, our students desire experience and experimentation in the classroom and extracurricular activities. They are enthusiastic, visually oriented, ready to cooperate, easily switch environment, emotionally open and spontaneous. However, these features cannot be seen by researchers, psychologists and educators as strong or weak sides of this generation. New generation are future adults, it is necessary to listen to the educational needs of our students, perceive them as independent and self-sufficient part of society, to make contact with them and start sharing positive experiences between generations.

To meet modern students' educational needs such as visual communication, constantly seeking feedback, thriving on instant gratification, preferring to type we have published the course on e-learning platform Moodle «KSU online». Its open access for authorized and unauthorized users allowed realizing element of distance learning. In addition to lessons and communication through KSU online, the teacher consulted students by e-mail or mobile phone, so at least one quarter of the students asked for advice by e-mail, 1/8 of the students contacted by a mobile phone.

Students were offered to use instructions published online, but they tried not to use them at all. It was preferable for them to consult with the teacher or with colleagues. The advantage of short instructions (instead of step-by-step instructions) is a short time students spend to understand a plot of a task ("what should I get as a result?"), increasing level of concentration on the task and, accordingly, the level of satisfaction after its execution, intensification of communication in a group and with the teacher, searching for additional information and taking independent decisions. It's interesting that students found sometimes unexpected ways to solve the same problems, using convenient for them online resources.

Instructions are saturated with images that provided quick perception of information by students, and their desire to show high quality of design, accuracy in their works.

Tasks provided freedom in the form of organizing work – individual, in pairs or groups. Only 1 out of 8 tasks "Creating a website" excluded other forms of work except individual and one task "Creating a Memory Card" is supposed exclusively group work, other tasks provided the freedom in choosing coworkers. As a result, 80 of 84 works were performed in pairs or small groups. The composition of groups has changed during the course but slightly.

Complex and problem tasks caused increasing communication in groups and between groups, a desire to work in a team and to distribute work.

The result of each practical lesson was an original creative work created by students (website, email, memory card, etc.). It's common when students take success of their creative works as their personal success; they consider their works as expression of their individuality. The majority of students acts competitive and tries to do their best. All the students were proud of their results, teachers and colleagues' appreciation strongly influenced on students' attitude.

Students' works were published on the course webpage. The views statistics of web page with the students' works two times exceeds quantity of views of the task page, which demonstrates the interest in the evaluation and comparison of creative works from students' point.

During the course we observed the absence of a psychological barrier to ICT that we faced with students earlier, competitive atmosphere, students acted with dedication, resourcefulness, creativity, aesthetics, aggressiveness, ambition and confidence.

We have analyzed and matched traditional ICT teaching approaches, characteristics of Net generation, empiric data (polls, page statistics) and presented contradictions in the table below.

Table 1. The contradictions of the present ICT teaching approaches to the generation Net characteristics

ICT teaching approach	Generation Net characteristic	Poll results
ICT teaching "from scratch" disregards the actual level of the student's ICT skills. As a result, school ICT discipline assignments are duplicated; lab manuals are detailed and tend to be comprehensive.	Tech savvy	84% of respondents have started to use the computer for learning 7 years ago or earlier.
Teaching materials are not interactive and updating.	Relying on search engines for information	About 26% of the students mentioned search engines as the most frequently used site on the Internet.
Weak level of visualization of teaching materials, lack of interactivity including hypertext	Interest in multimedia, "visual" communication	Movies and computer games have the second position among the purposes of using computer ranked by students.
Step-by-step manuals that presuppose learning by copying the sample, the absence of the original product as a result of the students' work	Creation of Internet content	Social nets, wiki-sites and forums have the third position among the most frequently visited sites on the Internet. All of them are a platform for a creation of people's own content, posting their opinion, sharing things made by them. 13% of respondents mentioned the creative activity as a major purpose for using the computer.

Table 1. (*Continued.*)

Students are constrained by one plotline in learning process, the absence of immersion, problem-solving and decision-making tasks and enough freedom for actions in realization students' learning trajectory	Multitasks on everything	The sum of hours for different everyday life activities informed by student is about 28 hours a day.
Weakly realized person-centered approach	Emotionally open	Social nets were ranked as the second position by students.
Individual fulfillment and performance of learning results	Teamwork and cooperation	Using computer for communication among students is placed on the third position after learning and entertainment purposes by students.

As for our course content and type of its presentation, results of interviewing students of Faculty of Pre-School and Elementary Education in 2012-2013 academic year have confirmed last year statistics: quality of teaching materials on KSU Online was highly appreciated by students, average score was 9.29 in 2011 and 9.16 in 2012 out of 10.

The results of the entrance poll of different faculties in 2011-2013 academic years showed the following tends:

- In 2011 89% of the respondents owned a computer or a laptop, this academic year 100% of students are owners of computer or similar device regardless of the faculty.
- 70% (2011), 68% (2012) and 69% (2013) students have an access to the Internet outside the university – thereby, this rate stays the same.
- However, amount of students who recognized themselves addicted to the Internet has grown from 24% in 2011 to 32% in 2013.
- Interesting results were found about visiting University website by students from different faculties. 17% of students of the third year said they had never visited the university site at faculties where teachers hardly use ICT in teaching, while the rate has tended to 0 (since 2011 to date) at faculties where most of the teachers regularly use ICT.

The number of students who have a positive attitude towards the use of ICT in education (inter alia, at lectures) has increased (see Figure 2).

FPSEE (2012-2013)   FFP, FT, FPHS (2012-2013)   FPSEE (2011-2012)

■ The information is easier to understand, as it is structured and illustrated
■ Information on the screen distracts from teacher explanation
■ The text on the screen makes note taking easier
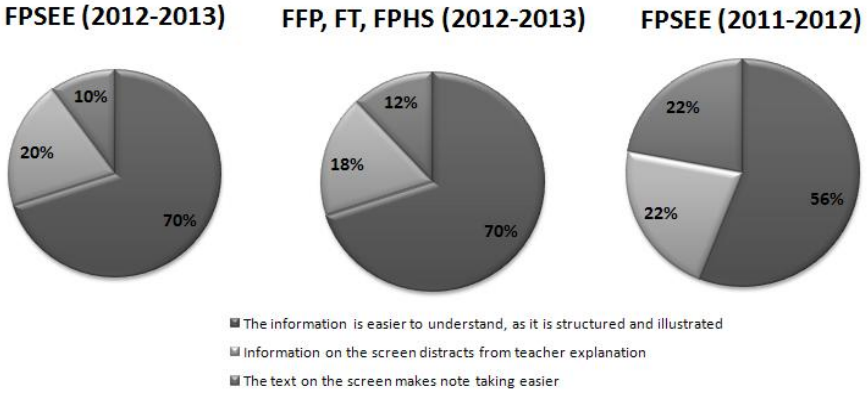
Fig. 6. Students' Attitude towards the Use ICT during Lectures

The purposes of using the computer by students have almost the same rating, regardless of year and faculty (see Figure 3).
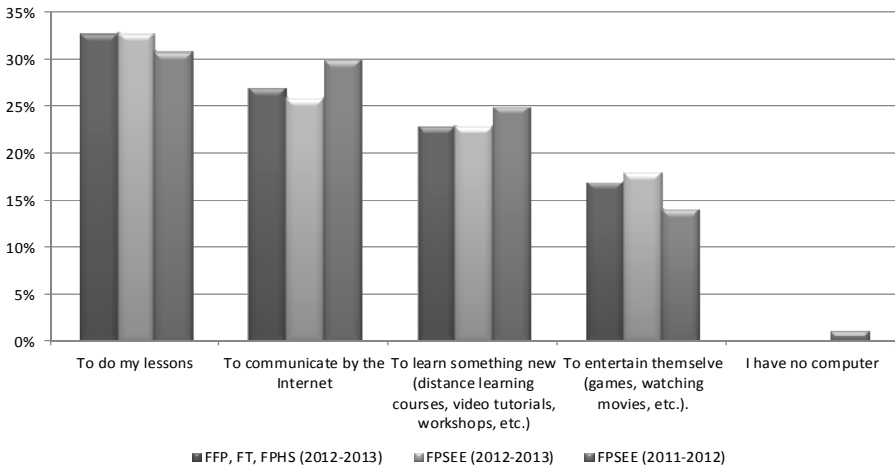

Fig. 7. The Purpose for Using a Computer and Internet by Students

Social net is becoming more popular among services for communication (see Figure), IME and email are also frequently used.
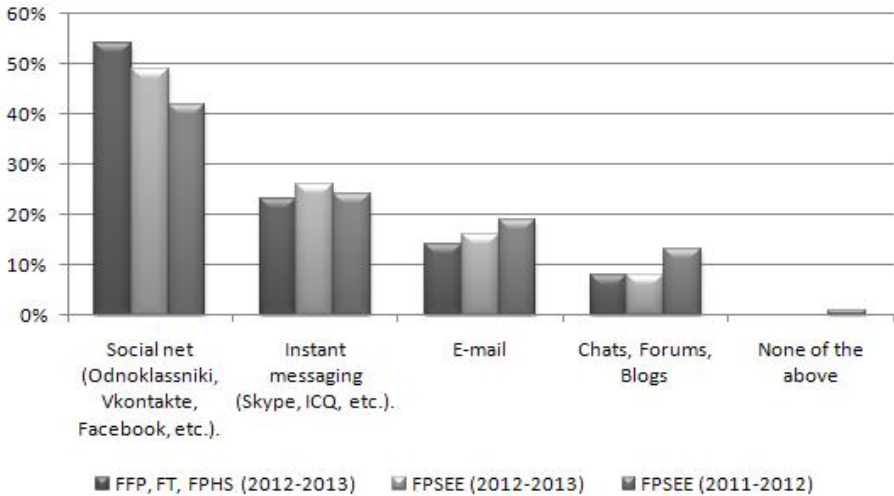
Fig. 8. Using Communication Services by Students

Modern students overestimate their skills for online searching according to Berk. The results of our research have proved this fact. The results of entrance poll and test in Informatics in our course are contradictory. The majority of students estimated their level of ICT proficiency as excellent and good. The rate is depicted below.
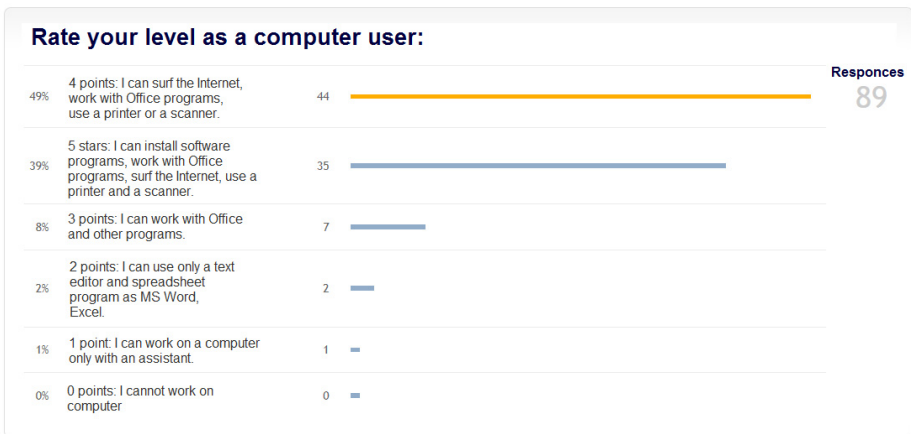
Fig. 9. Results of Students' Self-appraisal as a Computer User (FFP, FT FPHS, 2013)

The entrance test contains 45 comprehension questions and is designed by analogy with ECDL test. The aim of testing is to check residual knowledge of school computer discipline. Its results showed that only 4% of students had a score higher than 4, 31% had a score more than 3 but less that 4 points, 43% had from 2 to 3 points and 22% scored less than 2 points.

During the practical lessons following problems that are related to organizational issues and students attitudes have appeared:

- Students have no skills to manage their time and efficiently work without strict teacher's control, neglect deadlines. Only some students uploaded their works on time.
- Not all students use email regularly. Many of them chronically forget their email user names and passwords. Students are confused if use other browsers or other version applications. As a result, login process for email or distance learning system regularly takes up to 7 minutes.
- There is no clear understanding of the terms among students.
- It is necessary to consider different pace of students' work while planning lessons. Some of students do not regularly use computers, so typing, mouse control, searching for a command cause a delay.
- Plagiarism. Some students prefer not "to waste" their time to do lessons. They easily copy their colleagues' results or download similar ones from the net. It is important at the first lesson to highlight the value of students their own creative work and punish the students' attempts to copy someone else's work. Under the strict control the number of plagiarism cases decreases but does not disappear. It is growing according to the task's complicity. The reason for such situation is the priority for many students to get a good grade and not knowledge.
- The students do not like reading, especially READING OF long instructions. Usually they prefer to ask a teacher or colleagues than to read a manual step-by-step. It is also associated with different systems prevailing perception among students. Feature of the course is that most of the teaching materials are stored in digital form. Creating e-learning course does not require additional financial costs, as opposed to hard copy. It is faster and easier to edit and to update. However, reading from the screen does not give effective results. Perceived only about 40% of the information.
- Lack of collaborative activities, such as work in pairs, groups and teams, social assessment, problem-solving and decision-making tasks. A student presents results of an individual work only to one person– his teacher, and feels subordinated under such conditions. In addition, it is the reason of the lack of the critical view on his own work. This results in the students' frustration and dissatisfaction to any criticism. Teacher comments are usually perceived in a negative or indifferent way.
- Educators should pay special attention to students' feedback about effectiveness of teaching activities and the level of their satisfaction. Such monitoring and evaluation allow teacher to obtain information about teaching effectiveness and quality, get information to improve or change his work. It should reflect the dynamics of the level of one student's knowledge.

The presented requirements to discipline designed in previous work on digital literacy formation [17] have been adapted to Berk's pedagogical strategies. As a result, we have formulated new approaches considering educational needs of the Net students' generation (see Table 2).

Table 2. The approaches of teaching ICT discipline to meet educational needs of generation Net students

The teaching element	Requirements
Discipline content	– A discipline content should reflect current research and encourage students to use new approaches and technologies, highlight current trends in ICT development. – Tasks presuppose creative activity, form skills of self-learning and motivate to further development. Examples are inspiriting. – Result of task execution are useful, valuable and applicable product in professional practice. – All elements of the discipline are focused on future professional activities.
Students motivation	– All elements of the course (assignments, surveys, etc.) help students to see themselves in their future profession, particularly in teaching profession. – It is important to emphasize interest to the students' opinion, to make possible them to contribute to collective projects, for example, to create a bank of teacher's materials; – Student wants to get a feedback from his colleagues about his work. Any result of creative task should go through following stages: creation, publication and social assessment with definite criteria. – Student wants to evaluate teacher's work too, so a teacher should organize the ways for students to impact on the discipline development, to express their wishes.

Organizational issues	– Tasks presuppose collaboration, facilitate communication and interaction to develop personal aspect of student and help to realize his individuality.
	– Clear structure, planning, to do lists and deadline system.
	– Active use of formative assessment techniques.
	– Ice-breaking, team-building and communicative exercises at the beginning and at the end of the lesson to form communicative skills, values, relationship and positive atmosphere.
	– Use no more than two new computer environments at lesson.
	– Teacher should consider in the selection of services to work at lesson:
	    – registration absence or its simplicity,
	    – functionality,
	    – easiness,
	    – necessity to install additional software,
	    – potentiality to use in profession.

The main aim of updating the discipline was to help future teachers to create and organize their own learning space in the Internet. Therefore online interactive services that can be used for communication and teaching pupils were included (creating word clouds, mind map, open online documents, site, etc.). We also considered Berk's strategies while designing the discipline. The updated version of "Information Technology" discipline was taught at the Faculty of Foreign Philology (FFP) - 104 students, Faculty of Translation (FT) – 61 students, Faculty of Psychology, History and Sociology (FPHS) – 28 students.

Table 3. The implementation of Berk's teaching strategies in the course "Information Technology"

Characteristic of Net Gen student	The implementation of educational strategy
Tech savvy	The virtual discipline environment was created with the system of distance learning ksuonline.ksu.ks.ua located on a MOODLE platform. This system allows developing a course with such elements as glossaries, wikis, multimedia clips, presentations, tests, blogs, forums, etc.
Teamwork and cooperation	Some tasks are complex and presuppose collaboration, while their execution reinforces the cognitive interpersonal communication and interaction of all participants. An important stage is to prepare a group of students to work together. To ensure about students' readiness for cooperation a teacher should arrange Ice braking, team-building and communicative exercise (up to 5 minutes) at the beginning and at the end of lesson. Teacher, who works in the computer classroom, usually recognizes his students primarily "from the back." Therefore, such exercises facilitate personal contact with the group, which is especially important while teaching 1 or 2 credit disciplines.
Interested in multimedia, "visual" communication	The discipline content was developed and designed considering students' interest in "visual communication" and multimedia. Videoclips and presentations were added to each theme. The tasks and manuals contain minimum of text information and maximum of graphics and illustrations. Teachers included such elements as blogs and forums.
Rely on search engines. Multitasks on everything	A teacher encourages students to use search engines during the course and work with Google services as Google.Drive, Google.sites, etc. This satisfies the interest in creating online content and allows simultaneously to work with several documents. It's also an efficient tool of organization of group activities.

Table 3. (*Continued.*)

Retention in the profession	Organization of students' activity is a process of constant modeling of professional activity of specialists under learning conditions. The students of teaching specialties create educational games, tests, documents, tables that are useful in their professional practice. The results of the work are evaluated not only technical element, but also educational one. Also such task as creating a presentation "My choice" (students aimed to describe situation of their professional choice, analyze their present achievements and capacities, goals and dreams, ways to attain them) and collective writing of mind map "Modern teacher" were added.
Emotionally open	Tasks are person-centered and presuppose creation unique results that will describe student's own lifestyle, attitude, etc. This approach helps to decrease the quantity of plagiarisms and contributes to the development of their creative abilities. Each student's work passes through formative assessment: self-appraisal, social assessment, teacher's assessment.

Strategies described above are in agreement with learning strategies that have been formulated in the UNESCO recommendations and the requirements presented to ICT competence of teachers - UNESCO's ICT Competency Framework for Teachers [19].The selection of tasks should be aimed to strengthen professional orientation of future teachers (creation of interactive games, information booklets, working with serial documents, recording and analysis of quantitative data in a spreadsheet), to reduce the proportion of reproductive work (complex creative tasks), and to focus the training process at development and production of knowledge.

Tasks such as making word clouds, mind maps, learning games are relevant to the professional and educational discipline orientation. In addition, they simulate creative activities and can be easily adapted to a group work.

Poll Results of 2012-2013 academic years at Faculty of Pre-School and Elementary Education are comparable with poll results published one year earlier. The quality of teaching materials on KSUOnline highly appreciated by students, average score was 9.29 in 2011 and 9.16 in 2012-2013 out of 10. The novelty of lectures was assessed as 7.59 in 2011 and 6.84 in 2012-2013, the novelty of practical tasks had 7.64 and 7.39 respectively.

The students' preferences about the most interesting and useful for future professional tasks have changed. In both of these categories the task "Creating didactic game" leads. Making a poster "It's interesting to know," creation of "Site Class" and creation of online poll follow in the rating. These tasks we preserved in the updated version of the discipline "Information Technology". As a result, new version of "Information Technology" discipline has the following structure:

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Lesson 1. Registration on KSUOnline, taking an entrance poll and test. Presentation "My choice" with the following structure:
   1. My strengths and weaknesses (academic, creative, personal, individual aspects).
   2. My goals, objectives and deadlines (to 2020 year).
   3. My completed tasks.
   4. A letter from You yourself in 2020.

Lesson 2. Creating a class site on Google Sites (Students add, delete pages, edit them and insert pictures and text, change site's design). Taking a poll "NET Gener profile Scale".

Lesson 3. Creating a poll on Google Drive and inserting it to the site.

Lesson 4. Creating a cloud of words (Tagxedo service), publishing pictures with a cloud of words and writing an assignment for the pupils on the "Homework" site page. Changing assignments with the word clouds and its execution.

Fig. 10. Ipyna *Rebenok*. Animals (5 grade). Task: Sort the words into categories: domestic animals and wild animals. *Alena Kudina*. Winter holidays (7 grade). Task: Write a story about winter holidays using words from the wordcloud. *Yana Yanyk*. Appearance (7 grade). Task: Make several word combination on the topic "Appearance".

Lesson 5. Creation educational games with triggers or hyperlinks in MS PowerPoint.

Lesson 6. Social expertise of the games (organized with Google Drive – a spreadsheet). Watching the movie "The image of the modern student" by Michael Wesch (Kansas State University, 2007). Creating a collective essay "How I like to learn" in online document on Google drive.

Lesson 7. Co-creation of mind map "Modern teacher." Taking final poll and test.

Making a poster "It's interesting to know" and contributing to wiki page "Communication in the network" are for independent work.

Returning to the problem of assessment it should be noted that in a presentation "My Choice", 68 students described their school successes and achievements considering them as the next step in their professional development, but some students evaluate these achievements as formal, not real:

> "*To the moment of leaving school I had about 60 letters of honor in my* "*collection*". *But I understand they only have formed my ability to learn and now mean nothing*".

Ice Breaking. We believe that training and game technologies are vital elements in teaching students, especially students of pedagogical specialties. They help contact the auditory rapidly, create friendly atmosphere and get in tune to work and, as a result, to improve relations among students. Besides, it's favorably, if a prospective teacher has an opportunity not only theoretically explore innovative techniques but test them oneself as a student. Current students who were taught traditionally would teach differently in several years.

Obviously, a success of training approach strongly depends on a teacher personality and his skills in training and teambuilding. Therefore, the authors of this chapter have selected games and exercises that do not require special teacher's skills and knowledge or any additional devices.

Despite the fact that the third-year students have attended a number of courses on psychological and pedagogical technologies, the participation in training and communication games was a discomfort for them. During the course, we've found that the most third-year students have lack of communication. For example, at the first lesson after the game "Introduction", we asked all students to tell about their three small victories. Such "victories" were often met with utter surprise in the group. It was uncovered that the students' ability to learn is directly connected to their sense of self-confidence and psychological atmosphere.

As a closing activity, we frequently use games to develop students' awareness about their course progress. In our opinion, the most successful were the games "Medal for me" after creating the class site – the most difficult task, and "Nobel Prize" for the last lesson of the course.

The plot of the first one is the following. The teacher gives every student a round piece of paper to write his name and his/her brightest achievement during the lesson (e.g., students have dedicated the medals "for patience", "for the first website in my life" and etc.). Students, one by one, come up to the teacher who is ready to award a medal with cheers and all the honors. It's important all students are standing in a round at this stage of the game. If students are sitting, they feel like spectaculars but not like participants.

The game "Nobel prize" is similar, but the level of psychological comfort is lower. The students are asked to choose his highest achievement during the course. Then every student in turn stands up on the chair – "the stage" – and try to act as a famous scientist, starting his Nobel speech with the phrase "The core of my discover is …", then tells about his/her best results, thanks the people who helped him/her, etc. Then the group should give the student a standing ovation. The most difficult thing for teacher in this game is to help some students not to be afraid to climb "the stage".

Understanding students' progress and success themselves is an important factor that significantly affects their motivation to learn and improves general attitude to the subject. Therefore, summing up the lessons, the teacher should emphasize new knowledge and skills gained by students.

Training elements in students' groups of different teachers' specialties and years of study had different reaction. Some students express stunning and rejection: "Why should I do that? It is not serious." despite the fact that they had finished Innovative Teaching Methods and Technologies discipline, Training exercise was an extraordinary situation. One teacher said describing her experience: "Third-year students look so serious that sometimes I feel scared to come to the classroom. It is like teachers and students have switched their roles...". We find it particularly important to use the elements of training and communicative techniques working with students of teaching specialties. Present students are future teachers who are taught traditionally. In several years, they'll adapt one of teaching styles they have seen. It is important to implement innovative techniques and give the students a chance to test them in practice.

The social aspect is a priority for a new generation life, they tend to have a relationship regardless of the field of interaction, and education is not an exception. If a teacher does not build relationship consciously, it usually takes the worst form. A teacher should know that a mark is no longer a sufficient motivation for the positive attitude of a student to the discipline, especially in the pass-fail system. It is clear that students often associate the discipline with teacher's personality. The high quality executed tasks show not only an attempt to get a high mark but sympathy to a teacher. In computer disciplines social aspect is often nearly absent or poorly developed: most of the time students are working individually on the computers. Times of detached teacher have passed. Today's successful teacher can easily contact the audience in a short time, acts as a partner, a friend and a leader.

Social Expertise. It's time to change assessment system, to shift the emphasis from control to formative function to strengthen students' motivation. In addition, it's necessary to vary teacher's assessment with self-assessment and social assessment due to teacher's criteria. Students can determine the quality of the work due to criteria and assess technical realization, structure, relevance to age of pupils, subject, design, quality of illustrations, literacy, etc. This strategy forced students to think about their works from independent standpoint.
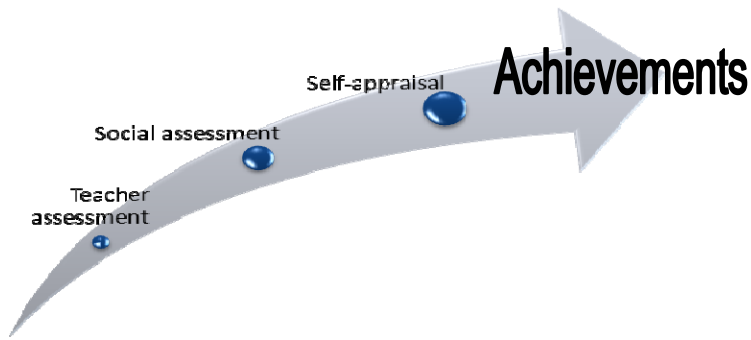
Fig. 11. Increasing Students' Achievements by the Method of Formative Assessment

The specific of a teacher profession is that teaching materials should be adopted for unique group of children and pedagogical situation. Therefore, our course includes many tasks, results of which are students' individual or group creative works. However, we have faced a problem with an evaluation of such pieces: a student's work may be technically perfect, but generally does not produce the impression of integrity and completeness. We consider a social expertise as the best method of evaluation in such situation. Its aim is to establish the extent for quality of work, as well as the preparation of proposals for achieving compliance. An assessment of works by students allows us to solve the problem of content of work, the quality of its performance, to identify weaknesses and make appropriate adjustments, to make recommendations for improvement. The method of social expertise helps to develop critical evaluation skills and change social value orientations in a group of students.

Criteria for evaluating students' works on each topic and shared document were published by the course developers to implement social expertise. Each student has an available document with criteria and fields to give other students' marks. In our point of view, each work should go through following stages: creation, publication (presentation) and an assessment. Students could try a role of expert, while the teacher's role was to coordinate and guide. A student with low self-esteem at first is afraid that his groupmates will assess not his work but his person, but it has never happened, all students are aimed to be objective and independent judges.The results of social expertise provided adequate evaluation of works. It also solved the problem of students' misunderstanding and distrust about results of teacher's evaluation and ignoring proposed criteria during creation student's own work. It also encouraged students to create neat and bright works that can be interesting for other students and almost entirely help to escape the problem of plagiarism.

Social expertise has stimulating, diagnostic and formational functions. A wish to get social appreciation motivates to create high-quality individual works. Such way of assessment forms critical perception of the information.

Teamwork in the Network. We used online service GoogleDrive to meet the new generation needs in communication in social networks and multimedia. GoogleDrive lets share documents for collective editing. In the course we used:

− Google spreadsheets for social expertise;
− Google Text Document "The way I like to learn…" to learn more about a comfortable learning environment for modern students;
− Memory-card "An image of a modern teacher" to reinforce retaining students in profession.

Use of shared documents in asynchronous collaborative writing was inspired by a set of collaborative learning theories that use Piaget's model of equilibration to describe how the cognitive conflicts generated by the heterogeneity of the participants motivates students to contribute to a document and learn from their interactions [18].

Scientists give preference asynchronous types of interactions that allow evaluating work of those students who were absent at traditional lesson too. However, there is a problem that not all services have option for monitoring the contribution of each student. Using collaborative writing allows the teacher to monitor the progress of student learning better, creates a sense of responsibility among students and motivates them to cooperate.

Creation of opened for collective editing documents has aroused interest to collaboration. Students said they liked not only to express their opinions, but be able to see what others are doing and react to it.

Collective work should be preceded by a problem situation. For example, for the setting a discussion about an efficiency of modern education we used the video "The image of the modern student," which presents the results of a study conducted by Michael Welsh, the University of Kansas (USA). It indicates problems in the modern system of education from students' point of view. Collective writing the shared document "The way I like to learn" is the next stage of work on this topic. The result of students' discussion should be presented in "the tree of changes" with ideas how to improve the system of education. The next step is to create mind maps "The image of the modern teacher," in which students make a portrait of the characteristics of the modern teacher. The result of these activities is a formation of social skills and social consciousness.

The process of group learning is opposed to traditional front-to-individual and characterized by such basic features as

1. Participation. Group work reinforces an information field extension of individuals and a group as a whole. They learn to discuss problems together, make collective decisions and develop mental potential.

2. Socialization. Students learn to ask questions, listen to their colleagues, to monitor presentations of other students and interpret heard. Gradually understanding of the need of active participation in a work group and responsibility for one's contribution in collaboration are coming. Students are given the opportunity to "try on" different social roles.

3. Communication. Students need to know how and when to ask the question of how to organize the discussion and how to manage it, how to motivate participants, how to speak, how to avoid conflicts, etc.

4. Reflection. Students should develop skills of inner reflection and self-analysis, understand how to assess the results of their own activities, individual and group participation, and the process itself.

5. Interactions for self-development. Students should realize that the success of their learning activities depends on the success of each individual student. They should to help each other, to support each other, to foster development, because in cooperative learning model it is a necessary "win-win" process. In this case, everyone is responsible for everyone, for all, for the entire educational process.

The analysis of the benefits of teamwork and experience in the use of the learning process, set up new questions:

− choice of instruments for students' interaction (eg, forums, knowledge map, wikis, online services);
− scenario (a sequence of actions in students' interaction and solving a problem);
− pedagogical aspects (a learning objective, a creation of a motivational moment, methods of estimation of the group and a contribution of each student, etc.).

It has defined the vector of our forward research: computer-supported collaborative learning (CSCL) to improve traditional and distance learning.

Another important improvement in the organization of the discipline was using of open online document on GoogleDrive among teachers. Each of three teachers has contributed to planning, selection of training exercise and other notes. After each lesson, teachers made a record in "a discipline online diary" to describe in free form results of the lesson, such as the most common students' mistakes, teaching and technical problems, positive situations, questions from the students, etc. Keeping a discipline diary had a great success. Teaching has become more effective and convenient, the level of awareness and collaboration among teachers has risen, so now teachers create and use it at other disciplines.

4   Results and Discussion

Developed approaches allowed us to improve a range of disciplines including "Information Technology", which is taught for students of all teacher specialties. We also applied them to following disciplines: "Introduction to Information Technology" (for future teachers of elementary school and Computer Science, the 1st year of study), "Fundamentals of Computer Science and Applied Linguistics" (translators, the 2nd year of study), and "Office Computer Technology" (programmers, the 1st year of studies).

Students expressed their positive attitude verbally in the classroom and several students sent e-mails with gratitude after finishing the discipline.

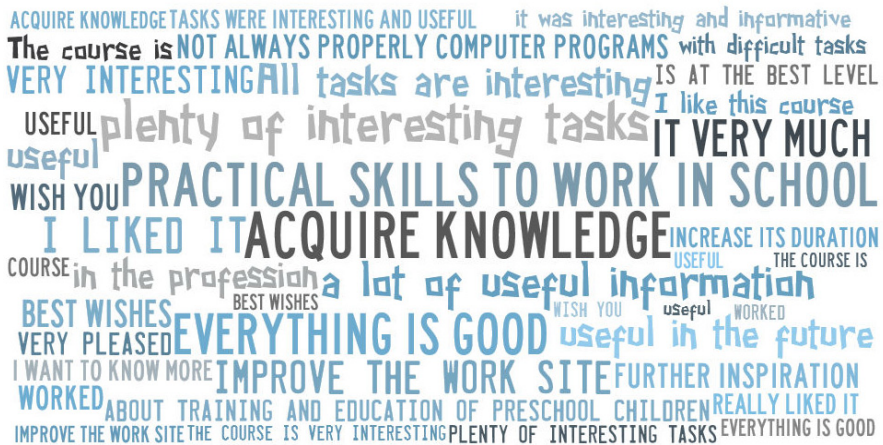The results of the final poll confirmed their appreciation.

Fig. 12. Word cloud composed of students' comments about IT discipline

5   Conclusions and Outlook

Thus, we have obtained the following results:

1. To eliminate mismatching vision on learning format and bridge the gap between generations we discussed and analyzed characteristics of Net generation students that should be concerned while developing and teaching ICT disciplines. Following characteristics are directly connected with teaching ICT disciplines: technology savvy, rely on search engines for information, interested in multimedia, create Internet content, operate at ―twitch speed, learning by inductive discovery, learn by trial and error, multitask on everything, short attention span, visual communication visually, crave social face-to face interaction, emotionally open, constantly seek feedback, prefer to type.

2. We highlighted the discrepancy between the characteristic of today's students and traditional ways of teaching ICT disciplines. The characteristics of modern students are different to traditionally explicit step-by-step instructions to labs, lack of interactivity of didactical materials, weak level of visualization, individual fulfilment and defense of the results, absent of personal centered approach and creative element in tasks.

3. We have found new approaches to resolve these discrepancies and implemented them in teaching practice. Such elements as discipline content, student motivation, and organizational issues were brought up and reconsidered.

4. We have made a revision of the courses to form professional awareness of future teachers, change learning environment and students' attitude to position of socially active, open-minded, creative specialist.

In the future, we plan to expand the list of pedagogical specialties to which the updated version of the course "Information Technology" will be taught and improve other disciplines according to the proposed approaches.

We have defined following problems that need further research:

- methods of reinforcing students' motivation while group work;
- assessment of every participant's contribution in a group project;
- organization of discussion and collaboration between future teachers and practicing teachers;
- sharing experience among other university teachers, organization of trainings, workshops, seminars, round tables, etc.

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