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The Roadmap of Collaboration Skills from Programmed Teaching to E-learning

Abstract

The article presents the comparative analysis of the basic principles of programmed teaching, and constructivism for their subsequent use in creating open learning didactics in view of the collaborative approach and collaboration-oriented activities. What is investigated is the fact that the same idea forms the basis of the two paradigms (constructivism and personal learning): the humanistic character of education, taking individual characteristics into account, the activity-based approach, and the collaborative activity of a student. The assumptions about increasing the efficiency of the educational process, based on the ideas of integrative unity of these concepts, are justified. Further development of the personally-oriented approach in terms of such interconnected approaches as e-learning, connectionism, and combined learning is discovered. Simultaneously, programmed teaching – also experiencing its renaissance – can be used effectively and purposefully in educational collaboration in connection with other paradigms.

Key words: Collaboration, programmed teaching, personally-oriented approach, constructivism, e-learning

Introduction

Knowledge of the course and the regularity of the learning process are the starting points in formulating the accuracy and organisation of the educational process (Grzesiak, 2010). For this reason, modern teaching emphasises the dialectical unity of teaching and learning, conditioning the mutual coexistence of both of these processes (Strelau, Jurkowski & Putkiewicz, 1975).

J. S. Bruner emphasises that “devising ways of teaching young can’t forget about what we know about the development – with its conditions and potential opportunities” (Bruner, 1974, p. 20). The same author puts forward four basic requirements for the teaching theory:

5. The theory of teaching should specify what experience students develop most effectively in an inclination to learn.
6. The theory of teaching must identify the ways to assign to any resource of knowledge such a structure that makes this knowledge most easily digestible for the student.
7. The theory of teaching must specify the most efficient order in which the material to assimilate is going to be presented.
8. The theory of learning must specify the nature and frequency of use of rewards and punishments in the process of learning and teaching.

Within the modern educational paradigm, the 21st century skills concept (Abbott, 2013) is motivated by the belief that teaching students the most relevant, useful, in-demand, and universally applicable skills should be prioritised in today’s schools, and by the related belief that many schools may not sufficiently prioritise such skills or effectively teach them to students. The basic idea is that students, who will come of age in the 21st century, need to be taught different skills than those learned by students in the 20th century, and that the skills they learn should reflect the specific demands that will be placed upon them in a complex, competitive, knowledge-based, information-age, technology-driven economy and society.

While the specific skills deemed to be the “21st century skills” may be defined, categorised, and determined differently, the term does reflect a general – if somewhat loose and shifting – consensus. The following list (Abbott, 2013)) provides a brief illustrative overview of the knowledge, skills, work habits, and character traits commonly associated with the 21st century skills:

- critical thinking, problem solving, reasoning, analysis, interpretation, synthesising information;
- research skills and practices, interrogative questioning;
- creativity, artistry, curiosity, imagination, innovation, personal expression;
- perseverance, self-direction, planning, self-discipline, adaptability, initiative;
- oral and written communication, public speaking and presenting, listening;

- leadership, teamwork, collaboration, cooperation, facility in using virtual work-spaces;
- information and communication technology (ITC) literacy, media and internet literacy, data interpretation and analysis, computer programming;
- civic, ethical, and social-justice literacy;
- economic and financial literacy, entrepreneurialism;
- global awareness, multicultural literacy, humanitarianism;
- scientific literacy and reasoning, the scientific method;
- environmental and conservation literacy, ecosystems understanding;
- health and wellness literacy, including nutrition, diet, exercise, and public health and safety.

While many individuals and organisations have proposed definitions of the 21st century skills, and most states have adopted learning standards that include or address cross-disciplinary skills, the following are three popular models that can serve to illustrate the concept and its applications in education (Abbott, 2013):

- Framework for 21st Century Learning (The Partnership for 21st Century Skills),
- Four Keys to College and Career Readiness (David T. Conley and the Educational Policy Improvement Center),
- Seven Survival Skills (Tony Wagner and the Change Leadership Group at the Harvard Graduate School of Education) (Suto, 2013).

In lieu of the fact that leadership, teamwork, collaboration, and cooperation are considered to be an integral part of the 21st century marketable skills scope, the objective of this paper is to consider the placement of collaborative activities and skills across educational paradigms.

Collaboration is commonly defined in various sources as: 1) an act or process of working with another person or group of people to create or produce something; a piece of work produced by two or more people or groups of people working together (MWDO, 2017); 2) “united labour, co-operation; especially in literary, artistic or scientific work” (OD, 2015); 3) “To work jointly with others or together especially in an intellectual endeavor.” (WTNID, 1993).

In education and business coaching, collaboration is referred to as two or more people working together to accomplish a certain objective, to achieve shared goals (Boston KM, 2014). It is a recursive (Marinez-Moyano, 2006) process where two or more people or organisations work together to realise shared goals – which is more than the intersection of common goals seen in co-operative ventures, but rather a deep, collective determination to reach an identical objective – by sharing knowledge, learning, and building consensus. Structured methods of collaboration encourage introspection of behaviour and communication (Spence, 2006). These methods specifically aim to increase the success of teams as they engage in collaborative problem solving.

It exists in two main forms:

- *synchronous*, comprising of Same Place, Same Time and Different Place, Same Time models; and
- *asynchronous*, comprising of Same Place, Different Time and Different Place, Different Time models (Boston KM, 2014).

Principle models and corresponding features of collaboration are:

1. Same Time, Same Place: discussion, brain storm, communicative skills, access to documents, access to educator, polling, Project/task management, rosters of multiple types, calendaring/scheduling;
2. Same Time, Different Place: lecture, discussion, workshop, research, tutoring, conference, file sharing, resources;
3. Different Time, Same Place: resources, control;
4. Different Time, Different Place: message exchange, review, assessment, resources.

Participants of reciprocal educational collaboration include universities, educators, and students. In turn, student's collaboration environment includes: 1) students from university, 2) teaching staff of university, 3) administrative staff, 4) experts, 5) peers, 6) tutors (MOOC), 7) family, and 6) employers.

Among the *indicators of effective collaboration* are: group work, shared responsibility, shared decision making, co-depended work (Townsend, DeMarie & Hendrickson, 1998). The given indicators are traced across educational paradigms.

Programmed teaching

In 1954 B. F. Skinner embarked upon a series of studies designed to improve teaching methods for spelling, math, and other school subjects by using a mechanical device that would surpass the usual classroom experience. General theoretical basis of programmed instruction created an American psychologist B. F. Skinner was based on the following principles (Tollingerová, Kněžů & Kulič, 1966; Heba, Kapounova & Smyrnova-Trybulska, 2013):

- the principle of active response;
- the principle of strengthening/confidence;
- the principle of small steps; rule one's own pace;
- the principle of management.

He believed the classroom had disadvantages because the rate of learning for different students was variable, and reinforcement was also delayed due to the lack of individual attention. Since a personal tutor for every student was usually unavailable, Skinner developed a theory of programmed learning that was to be implemented by teaching machines (Wleklinski, 2014).

The teaching machine is mainly composed of a programme, which is a system of combined teaching and test items that carries the student gradually through the material to be learned. The “machine” utilises a fill-in-the-blank method on either a workbook or in a computer. If the answer is correct, the subject gets reinforcement and moves on to the next question. If the answer is incorrect, the subject studies the correct answer to increase the chance of getting reinforced next time (Wleklinski, 2014).

The teaching machine is merely a device for presenting the set of frames of which the programme is composed. However, it is not supplementary but all-inclusive. The programme will do all the teaching through a response/reward mechanism. Skinner also noted that the learning process should be divided into a large number of very small steps and reinforcement must be dependent upon the completion of each step. Skinner suggested that the machine itself should not teach, but bring the student into contact with the person who composed the material it presented. He believed this was the best possible arrangement for learning because it took into account the rate of learning for each individual student (Wleklinski, 2014). In such a fashion, a rudimentary form of limited collaboration was introduced – within the template of unilateral synchronous teacher-to-student model.

A Personally-oriented Approach

Traditionally, a personally-oriented approach is considered in the framework of developing education and provides a maximum consideration of individuality of a student – the unique identity of each person performing their livelihoods as a subject of lifelong development (Yakimanskaya, 1966, p. 9). I. S. Yakimanskaya rightly points that “[i]ndividuality is a generalized characteristic feature of a person, firm expression of which ... defines individual style of activity as a personal learning” (Yakimanskaya, 1966, p. 19). The purpose and objectives of personally-oriented learning is to help students understand themselves as individuals, “to determine and reveal their capabilities and to establish identity in implementation of personally meaningful and socially acceptable forms of self-identity, self-fulfillment and self-assertion” (Bim-Bad, 2003, p. 134).

The role of a teacher in an organisation of developing learning is in creating conditions able to encourage disclosure of every student. In a system of principles that reflect the current understanding of the organisation of personally-oriented learning, the following are included:

- education is not a self-aim, but a means of developing a student’s abilities and inclinations;

- each student is unique and individual;
- a student is a subject of educational process;
- a student is a subject of support in training;
- a student is provided with a freedom to choose the content (according to the curriculum), means and methods of learning material, and organisation of training.

Specific collaborative features of a personally-oriented approach comprise:

- providing positive emotional contact in “teacher-student” and “student-student” systems based on cooperation, co-creation, and motivation to succeed;
- recording the value of thought and academic progress of each participant of the educational process, and a tolerant attitude towards them;
- assessing learning achievements not only for compliance with educational standards, but also as stages of individual personal growth of each student.

Thus, the implementation of a personally-oriented approach in learning enables personal development of each student with the most complete view of its specific features. The same aim of a maximum possible development of personality and individuality demonstrates the constructivist didactics and open e-learning didactics.

Constructivism

The category of “constructivism” is derived from the Latin words “constructivus” (connected with construction, designing) and “iconstructio” (accession, construction). Construction in a process of learning is defined as “a means of deepening and broadening of received theoretical knowledge and development of creativity, inventive interests and aptitudes of pupils” (TMWD, 2017). Constructivism is argued by modern researchers to be a theory of knowledge identifying humans as generating knowledge and meaning from an interaction between their experiences and their ideas (Tobias & Duffy, 2009). At the early stages of constructivism paradigm development, J. Piaget introduced the concept of knowledge *schemata* – a framework of interaction between human experiences and their reflexes or behaviour patterns (Piaget, 1967).

In the basis of its ideas, educational philosophy of constructivism uses activity and consideration of individual, “subjective” experience of students and pupils. Having first appeared in the writings of J. Piaget, J. Brunner, J. Dewey, G. Gardner, the ideas of constructivist didactics are embodied in many proprietary methods of self-development and “free education” (M. Montessori, R. Steiner, C. Freinet, etc.).

The essential collaborative approach within the constructivist paradigm was derived by L. Vygotsky, known for his theory of social constructivism, who be-

lieved that learning and development are collaborative activities and that children are cognitively developed in the context of socialisation and education (Greener & Wakefield, 2015). The perceptual, attention, and memory capacities of children are transformed by vital cognitive tools provided by culture, such as history, social context, traditions, language, and religion. For learning to occur, the student first makes contact with the social environment on an interpersonal level and then internalises this experience.

In terms of this approach, collaboration at the conceptual level involves the following traits and features:

- awareness,
- motivation,
- self-synchronisation,
- participation,
- mediation,
- reciprocity,
- reflection, and
- engagement.

It is obvious that the same idea forms the ground for the two paradigms (constructivism and personal learning): the humanistic character of education, consideration of individual characteristics, the activity-based approach, and the activity of a student. E. S. Polat underlines that “both areas have grown from the core values of humanistic psychology and pedagogy, which is the antithesis of traditional, authoritarian pedagogy” (Polat, 2006, p. 16). As a result, there is a justified assumption of increasing the efficiency of the educational process, based on the ideas of integrative unity of these concepts. Let us discover their content and functional aspects in details and demonstrate how they can be used in the implementation of e-learning.

Constructivism considers the collaborative position of a student as being active, self-governing, mainly based on own constructive activity, only from time to time controlled externally by a teacher (Mandl, Koop & Dvorak, 2004, p. 27). The modern view of foreign researchers and educators on the organisational aspects of the educational process is reflected in the fact that a teacher creates conditions for students’ self-development, providing them with assistance (if it is necessary), but does not provide fully complete knowledge, models, algorithms, and methods for solving problems. This is similar to the main provisions of the inverted learning, which is important in the implementation of e-learning. A teacher’s activity is aimed at forming each student’ independence by using the instruments of self-construction of their previous experience and personal learning environment, which includes such components as electronic personal learning environment (Dubs, 1995, p. 30).

For E. S. Polat, the system of the basic collaborative principles of constructivism didactics consists of the following provisions (Polat, 2006, pp. 40–41):

- cognitive activity is an active process of constructing by a student of the new knowledge generated from earlier experience;
- knowledge is impossible without motivation and a sense of purpose of cognition;
- the basis of experience formation is the intellectual activity of a student which allows pedagogical motivation of his or her mental activity (encouraging thinking out aloud, statements of assumptions, hypotheses, etc.);
- learning process is effective in terms of communication and social activity of a student;
- cognitive activity is linked with a student's real life;
- training is based on the creation of conditions (choice of methods, learning, assessment tools), emphasising the intellectual dignity of each student, in particular the value of their point of view, personal approach to solving problems, unique vision, personal style of thinking.

Presently, the tasks of learning, and especially its specific focus on the individual, the constructivist approach is the most appropriate approach to systematic knowledge creation and designing activities in accordance with the final result. This approach is currently used for the development of conceptual positions of open education that involves the extensive use of e-learning environment and e-learning technologies.

E-learning

As Weiser stated, “the most profound technologies are those that disappear” (Weiser, 1991, p. 94). He was the first scholar to define ubiquitous computing as an environment where the computer is integral but embedded into the background of daily life. Applying this concept to the education field, electronic learning (e-learning), or more specifically ubiquitous learning (u-learning) involves learning in an environment where “all students have access to a variety of digital devices and services, including computers connected to the Internet and mobile computing devices, whenever and wherever they need them” (van 't Hooft, Swan, Cook & Lin, 2007, p. 6). In the education field, “ubiquitous computing allows us to envision a classroom in which the teacher remains focused on his or her field of expertise (e.g., math or social studies) while still utilizing technology to enhance student learning” (Crowe, 2007, p. 129). If information is to be used in multiple contexts, we must ensure multiple contexts learning strategies and ensure that students can widely use the educational information materials. Proceeding from the foregoing, it is possible to formulate some theses to be used in the implementation of innovative educational technologies and e-learning which didactics is created in nowadays:

1. Learning should be an active process. An active process is to provide students with tasks for using information in practical situations. Such information may be in a single learning environment of the institution and created by all players.
2. Students must construct their own knowledge instead of a personal perception without converting the data from teachers; students should be active participants in filling the educational space of the institution.
3. Joint and cooperative learning must be implemented. Teamwork is a life experience of students to work in groups that makes it possible to use successes of other students and to learn from them.
4. Students are required to be provided with the ability to control the learning process. This is possible by using formative assessment ideas – most MOOC use peer-to-peer evaluation technology.
5. Students should be given time to think and for retrospective analysis of their activity (reflection). Such reflection is desirable to be constant and open.
6. Students should feel that learning has a personal meaning for them. Therefore, it is useful for study materials to contain examples that are close to the interests of students, curious as additional information, and take into account their individual needs and learning dominating styles.
7. Learning should be interactive in order to ensure a high level and social significance. Training is an extension of the space of new knowledge, skills, and relationships with referring to data bases and using the resource of educational environment, including electronic ones.
8. The learning space formed by a teacher consists of the following components: activity, constructive cooperation, collaboration, commitment, complexity, content, communicativeness, reflectivity.

Of all the educational paradigms under consideration, e-learning relies almost exclusively on collaboration as an educational template, skills formation, assessment tool, and ultimate objective.

Forms of collaboration comprise of 2 groups:

1. relationship oriented: affinity networks, learning communities; and
2. task oriented: communities of practice, project communities.

Needs of collaboration in an open e-learning environment include the following issues:

- sharing information and documents;
- collaboration across physical locations;
- sharing creation and access to work products;
- identifying and accessing external experts and resources;
- classroom with easy-to-use tools;
- document repository;
- management tools, including scheduling and task management;
- lists, tables, rosters, tasks, score cards;
- communication tools, including e-mail, discussions, conferencing, voting.

Connectionism

In developing innovative approaches to implementing e-learning, it is necessary to consider ideas of connectionism, as information and educational space, including electronic, in which students, teachers, and administration cooperate and study, is a network where all nodes are data carriers (human resources, scientific and methodical works, library and Internet resources), and edges are connections between network nodes. It is known that the level of the university depends on established information and educational space. Leading universities have a well-developed and diverse network that works almost constantly, updates and develops, and is absolutely interactive. The nodes of this network are teachers-researchers, teachers-methodists, teachers-multipurpose, laboratory facilities, experimental basis, a powerful library, developed web resources. Students are in a constant contact with these nodes. In time they also become the relevant nodes of such an educational network.

Connectionism, proposed by G. Siemens (Siemens, 2014), is based on theories of network, chaos, hard-organised and self-organising systems. Study, by Siemens, is a process that takes place in an uncertain, vague, and changing environment. This process cannot be fully controlled by an individual. Study can be supported from the outside and is a combination of information sources. This means a creation of a personal learning environment for all students. This integration of the units allows us to rise to a higher level of understanding. Connectionism emphasises the transient, dynamic nature of learning. The principles of connectionism are as follows:

- Learning and knowledge require diversity of approaches and opportunities to choose an effective approach.
- Study is a process of network forming, connecting specialised nodes and sources of information materials.
- Knowledge is in a network that is constantly changing.
- Knowledge can exist separately from a person. Technology helps us in learning.
- The ability to learn new things means more than accumulated knowledge. The ability to extend is more important.
- Learning and cognition happen all the time – they are always a process, but never a condition.
- The key skill today is the ability to see connections between fields of knowledge, concepts, and ideas;
- Timeliness (accuracy, renovation of knowledge) is a necessary feature of modern learning. Instead of folders there come flows.
- Teaching is a decision making. In the light of the changing reality, we constantly have to make a choice of what to teach. The right choice made today may be wrong tomorrow because of changed conditions in which decisions were made.

The use of ICT in the learning process enables us firstly to increase the power of an information and education network (appearance of new resources), and collaborative educational environment, and secondly to increase the links between nodes (web 2.0) and take out students outside the campus (you can involve third-party experts from industry and business). Yet, it should be noted that the power increases gradually, and most universities still do not feel it. Against the background of the increasing average age of the teaching staff, changes are almost absent. Therefore, one of the priorities is to improve the qualification of teachers in ICT usage in the learning process, and the services and technologies of creation and development of a modern educational environment of the institution.

Siemens argues that behaviourism, connectionism, and constructivism can be used in learning in knowledge-environments distributed online and obtaining the necessary meta-skills. What is important is not the “know how,” but “know where.” Connectionism theory and constructivism can be used in massive open online courses (MOOC) and in the development of didactic basics of open e-learning.

Connectionism theory describes learning as a process of creating relationships and developing networks. It is based on the premise that knowledge exists in a world, not in the mind of a person. From a practical point of view, education should focus on where to find information (flows) and how to measure these flows, rather than trying to add it in the memory of a person.

Combined Learning

In recent years, information technologies have dramatically changed the education in the leading countries of the world. It is almost impossible to imagine the learning process without social services (Web 2.0). There are new pedagogical approaches (for example connectionism), and massive open distance learning courses, which train hundreds of thousands of listeners for free. At the same time, among modern approaches to learning the leader is still combined or blended learning. By definition of the Sloan Consortium, education is considered to be combined (mixed) if distance education is from 20% to 80%.

At this stage combined learning is a purposeful process of gaining knowledge and skills in the integration of classroom and extracurricular academic activities by subjects of educational process on the basis of use and addition of technologies of traditional, electronic, remote, and mobile learning with a student’s self-control of time, place, route, and rate of learning.

A combination of traditional and distance learning allows a teacher to use the strengths of each learning environment to achieve academic goals. The ultimate

goal of combined learning lies in improving the efficiency of learning by using systematic evaluation of related variables and integration of learning tools.

A combination of learning contributes to the optimisation of resources and time, and learning becomes more open; students have opportunities to learn to manage their learning and tend to be ready for the successful completion of the course.

The principles of combined learning are as follows (Abdel Bary, 2006):

1. One should focus on the goals, rather than on the method of delivery of course materials.
2. Different personal learning styles need support to achieve learning objectives.
3. Each participant brings different knowledge into the learning process.
4. In many cases, the most effective strategy is to meet the needs in a timely manner.

There are six reasons for the use of combined training (Dubs, 1995):

1. high educational level,
2. access to knowledge,
3. social interaction,
4. personal learning,
5. cost-effectiveness, and
6. ease of viewing.

According to J. Berzina, the key to combined training is the right choice of social services at the lowest possible cost. Achieving this, in principle, is possible because of clear goals and quality educational designing.

According to the Customer Satisfaction Evaluation Model assessment, the top ranking collaborative tool falls into the social media category. The social network engines are designed to store, share, promote, reference, and review academic output. The network type interface is designed to facilitate students' and researchers' personal collaboration, navigation through the thematic span of academic output, uploaded into public domain.

Combined study is recommended to be designed with using the ADDIE technology and taxonomy of Bloom (Abdel Bary, 2006). In a learning management system and various social services, the student's activity during whole educational process is planned and implemented. This increases a student's responsibility; he or she is not just learning a specific discipline, but learning to learn in collaboration.

Conclusion

To summarise, we note that the analysis of the main provisions of programmed teaching and constructivist didactics shows that it can be understood as a pedagogical philosophy: an ideology that is close to a personally-oriented approach.

The affinity of the personally-oriented paradigm of learning and constructivist pedagogy can be traced in several positions, particularly rich in content and functional filling. In constructivist pedagogy, in personally-oriented learning, and in e-learning, the main figure of the whole educational process is a student. Objectives of constructivist pedagogy, personally-oriented learning, and e-learning are to create conditions for the development of the personality and individuality of each student.

However, the content and functional fullness of personally-oriented approach concepts, programmed teaching, constructivist pedagogy, and e-learning have originality and distinction. Considering learning as an active process in which a student constructs his or her own knowledge at the situational interaction with the teacher, constructivist pedagogy specifies targets of an individual approach to learning and suggests ways to achieve them. Thus, the principles of training remain unchanged: activity, reliance on subjective experience, and independence of a student are the main factors of developmental education. Focusing on the development of personality and individuality, education constructivism, in fact, offers a way to achieve the goal of developing education, thereby reflecting the tactics of the educational process within the framework of the strategic statements of the personally-oriented educational paradigm. At the same time, e-learning forms the information-educational environment in which contact and collaboration between students and teachers happens and, as a result, generates an information network of the university. However, this network also aims at forming the independence of each student, as it provides management of self-construction of their experience, including the use of a personal educational learning environment. Therefore, today the usage of electronic environment and e-learning is the basis for the development of conceptual positions of open education in connection with some components of programmed teaching and learning.

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Mapa umiejętności w zakresie współpracy od nauczania programowanego do e-learningu

S t r e s z c z e n i e

W artykule przedstawiono analizę porównawczą podstawowych zasad nauczania programowanego oraz konstruktywizm dla ich późniejszego zastosowania przy tworzeniu dydaktyki otwartego kształceniu z uwzględnieniem podejścia i czynności zorientowanych na współpracę. Zbadano fakt, że podstawą dwóch paradygmatów (konstruktywizmu i osobistego kształcenia) jest ta sama koncepcja: humanistyczny charakter edukacji, uwzględnienie indywidualnych charakterystyk, podejście oparte na aktywności i działalność studenta zorientowana na współpracę. Założenia dotyczące podniesienia wydajności procesu edukacyjnego, oparte na koncepcjach integracyjnej jedności tych pojęć, są uzasadnione. Odkryty został dalszy rozwój podejścia zorientowanego na jednostkę pod względem takich wzajemnie ze sobą powiązanych podejść jak e-learning, koneksjonizm i kształcenie mieszane. Jednocześnie nauczanie programowane, także przeżywające swój renesans, może być efektywnie i celowo wykorzystywane we współpracy edukacyjnej w połączeniu z innymi paradygmatami.

S ł o w a k l u c z o w e: współpraca, nauczanie programowane, podejście zorientowane na jednostkę, konstruktywizm, e-learning

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Дорожная карта навыков сотрудничества от программированного обучения к электронному обучению

А н н о т а ц и я

Сравнительный анализ основных принципов программированного обучения и конструктивизма для их последующего использования в создании дидактики открытого обучения с использованием совместной деятельности, представлен в статье. Исследуется факт, что в основе этих двух парадигм (конструктивизм и личное обучение) лежат следующие идеи: гуманистический характер образования, учет индивидуальных особенностей, деятельность на основе совместной деятельности студентов. Предположения о повышении эффективности учебного процесса, основанного на идеях интегративного единства этих понятий, оправданы. Дальнейшее развитие лично-ориентированного подхода с точки зрения таких взаимосвязанных подходов как электронное обучение, коннекционизм и комбинированное обучение также обнаруживается. Одновременно программированное обучения переживает свое возрождение и во взаимосвязи с другими парадигмами может быть эффективно и целенаправленно использовано в учебном сотрудничестве.

К л ю ч е в ы е с л о в а: Сотрудничество, программированное обучение, личностно-ориентированный подход, конструктивизм, электронное обучение.

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La hoja de ruta de las Habilidades de Colaboración, desde la Enseñanza Programada al E-Learning

R e s u m e n

En el artículo se presenta un análisis comparativo de los principios básicos de la enseñanza programada y del constructivismo para su uso posterior en la creación de una didáctica del aprendizaje abierto en relación con el trabajo colaborativo. Se investiga el hecho de que en la base los dos paradigmas (constructivismo y aprendizaje personal) forman parte de un mismo concepto: el carácter humanista de la educación, la consideración de las características individuales, el enfoque basado en la actividad colaborativa de los estudiantes. Se justifican los supuestos acerca de la creciente eficiencia del proceso educativo, basados en las ideas de unidad integradora de estos conceptos. Se informa del desarrollo de enfoques interconectados tales como el e-learning, el conexionismo y el aprendizaje combinado. Simultáneamente la enseñanza programada también ha experimentado un auge de manera que en relación con otros paradigmas puede utilizarse de manera eficaz en la educación.

P a l a b r a s c l a v e: Colaboración, enseñanza programada, enfoque personal, constructivismo, e-learning.