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# PROSPECTIVE OF E-LEARNING TOOLKIT ENHANCED BY ICT DEVELOPMENT

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# ПЕРСПЕКТИВИ РОЗВИТКУ ІНСТРУМЕНТАРІЮ ЕЛЕКТРОННОГО НАВЧАННЯ ЗА РАХУНОК РОЗВИТКУ ІНФОРМАЦІЙНИХ І КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ

**Purpose.** Study of the prospects for the application of ICT to develop learning management systems (LMS) supporting individual learning trajectories for students.

**Methodology.** This study carried out case analysis of e-learning in depth, based on the papers of Russian e-learning researchers E. Makarenkova [1] and D. Chistov [2]. Psychology of education was taken into account to discover the learning process as an individual extraction of new knowledge from idea to its formalization. The results of psychologists were used in the implementation of Decision Support System (DSS) as an approach to develop the proposed LMS.

**Findings**. IT companies offer variety of information and communication technologies (ICT) for learning and management of education system. Thanks to ICT the impressive quality progress of training and education was achieved. But there are still a lot of uncovered opportunities to education improvement for public, learners and institutions. ICT makes it possible to revise the whole learning process of an individual. Nowadays, we are able to consider the theme of individual educational trajectories. Development of LMS with the approach of DSS allows us to design individual educational trajectory without additional costs for students and lecturers. However, the university has some expenditure on the establishment of this appropriate to their LMS.

**Originality**. We have combined the achievements of DSS and educational psychology to solve problems in e-learning. The study has discovered new prospects in the design of individual trajectories in education.

**Practical value**. The information and communication technologies for learning and education management have been analyzed. We have found that significant progress in the development of education was achieved through information and communication technologies, but left many untapped opportunities to improve learning for all participants: community, students, and teachers. Analysis of the practical application of information technology DSS revealed that its use allows us to develop LMS realizing individual trajectory without additional financial costs for students and teachers.

**Keywords:** *individual learning trajectory, mass open online courses (MOOCs), decision support system (DSS), knowledge management*

**Scientific problem.** The Russian educational system inherited its basic principles from the Soviet Union, where bureaucracy, accumulated over decades, substantially limited the efficiency and flexibility of the educational system. Higher education in Russia still focuses on production of strictly defined specialists, who tend to be unready for creation and innovation. Russian higher education fails to teach students how to study and think on their own, so they lack knowledge-management skills that will be essential for their professional growth and for growth of the economy. However, individual learning trajectories are increasingly available as mass products thanks to smart education technology [3]. Self-teaching options include open educational resources (OER) and mass open online courses (MOOCs). Thanks to the OER movement, every internet user can now design his or her individual educational program. The paper considers technologies that enable an individual to regulate his or her learning trajectory, so that a student can fashion his or path to knowledge provided that he or she can say: “I know that I do not know”. Such an approach to the educational process matches smart society concepts and offers new opportunities for universities in the future.

**Theoretical background.** For individual study to take root in Russia, there needs to be a prototype scheme of how it should work, based on the nature of study and research in specific fields – a comprehensive management tool that can support the student in planning his or her education.

Use of project management principles offer a way of achieving this, by systematizing students’ work with a view to a specific aim to be attained. Activities are organized using time management criteria, and quality control functions are applied to verify that the student’s learning outcomes meet all the necessary requirements and standards [4–9].

In such an approach, consistency between study modules or disciplines depends on consistency within the conceptual apparatus. The latter can be obtained automatically, provided there is a full description of competences and terminology for each curriculum.

Ability of the student to think intuitively is of crucial importance for the success of individual study. Hans Selye (1907–1982) compared the process of generation of ideas with the process of birth, and divided it into seven stages: *I* – love (the emergence of interest in a specific problem); *II* – fertilization (the study of the required information); *III* – maturation (the processing of facts in the subconscious); *IV* – birth pangs; *V* – delivery (the formulation of ideas); *VI* – investigation (grounding the ideas); *VII* – life (presenting the idea to the world). However, the boundaries between each stage in this standard scheme are hard to draw in particular cases. The subconscious mind may start processing information before all of the facts have been gathered, and such gathering may go on continuously. The transition from one level to another is only an approach towards the hypothetical limits of one of several continuous processes. Such processes, in the course of self-learning, include: the collection of factual material, theoretical work, experimentation (in some cases), and checking results.

By breaking down the scenarios provided by teachers in different faculties, the student designs his own study schedule to reach the most effective learning outcomes. But this process can be complicated, requiring the use of mathematics, and even then an optimal outcome can hardly be achieved. The use of computer technology can facilitate the planning processes for individual learners. Toolkits for network project models have been around for a long time (one of the most popular is Microsoft Project) and are very useful, but they cannot entirely reflect the specifics of professional education.

**IT for individual learning.** Distance learning is characterized by student flexibility in choosing the sequence of courses he follows and by a large share of self-learning compared with teaching. This puts high demands on the quality of computer-based courses and educational content [2]. Existing study schemes are divided between sequential and hierarchical, but both are rigid and therefore doomed to failure for the purposes of self-learning. Since each student has his individual areas of knowledge and ignorance and his own way of absorbing new material, the questions that arise for him are always unique in both form and content.

Expert systems oriented to specific disciplines and individually adapted to the user seem to offer the best solution for individual learning. But this approach is unrealistic, since the development of even a simple expert system is a laborious process. However, reasonable combination of rigid and flexible systems offer the best-possible compromise. Such a system should teach the student how to make the correct decision in any given situation and should test his knowledge to ensure that he has acquired that ability in the particular sphere of study, which he is pursuing.

The modeling and consulting tools offered by a classic decision-support system (DSS) reduce the burden on decision-makers, enabling them to focus on the intellectualization of their activities. This can be achieved by increasing the flow of information passing through the teaching system, which can be considered as a kind of information system. This increase is achieved thanks to the development of information technology, which is increasingly capable of processing relatively unformalized information (the development in mathematics and computer science of such areas as fuzzy sets, multi-valued logic, etc.).

The use of DSS systems in practice entails various problems, including poor integration of the software tools that provide specific DSS capabilities. This can be explained by lack of experience in the design and use of advanced DSS systems as well as high costs of development, due to the need for DSS models to be capable of complete management while also being compatible with other systems.

Making the learning system flexible and adaptable requires deep parameterization, which makes it extremely complex. Solutions are then needed that could individualize the basic study algorithm. The Markov Chain process could be appropriate for this. At any time, the amount of ignorance does not depend on the prior process of learning. So a step backwards in order to eliminate the ignorance is not necessary, but the student must have the appropriate toolbox and information to deal with the lack of knowledge on his own. The electronic performance support system (EPSS) is well suited to this purpose, since it enables the obtaining of basic knowledge as well as adaptation of the decision-maker.

Key features of the EPSS as compared with the DSS are as follows:

- Increased amount of unformalized information passing through the information system.
- Clear and friendly interface.
- More complete recording of the user's requirements, his psychological characteristics, and mentality.
- More flexible system of technology options.
- More flexible and complete training of the user in a functional information technology, which is new to him.

EPSS makes DSS more user-friendly for students by improving the tool-box and allows the user to continuously improve his knowledge. EPSS has an array of functional information technology and other technology, which we call educational. Any functional information technology in EPSS is unthinkable without an addition, which, in our case, is educational technology. The synthesis of functional IT and educational technologies creates an educational information technology, which is the basis of an automated system of distance learning.

Systematic integration of decision-making, modeling, teaching and consulting technologies into a unified system is a particularly important feature of EPSS.

The study system should include a built-in EPSS unit, which evaluates the viability and efficiency of decisions taken by students, as well as recognizing mistakes that have made and indicating to the whole system how to eradicate their source, i.e. the way of acquiring knowledge, which is best-suited to the student).

Detailing has to be carried out with a specific focus on the student's area of ignorance. This means that the learning trajectory may be constantly changing, since it is a function of the student’s psychological characteristics

(whether he thinks imaginatively or logically) and the amount of knowledge of the subject, which he possesses.

The complete vertical adaptability of EPSS to the student takes account of the nature of his learning faculties (imaginative, logical or systematic, his level of immersion in detail) and adapts the system's approach to the learning trajectory accordingly in order to achieve maximum efficiency. The introduction of learning technologies into the teaching system is an essential attribute of it, but it is easier to provide the student with the software tools and information, which can enable him to formulate what he does not understand and obtain answers to his questions.

So EPSS shouldcontain:

- Explanatory software, i.e. relevant data. For example, teaching materials, examples, cases, etc.
- Modeling software that prepares an answer to questions of the form, "What will happen if ... ?"
- Software, which provides an answer to the question "How do I...? "

A good teaching system can usually change the teaching strategy depending on the context of answers to test questions. The student follows a specific study algorithm with trajectory targets to which the system can eventually bring any student, and the systems recognizes ignorance, localizes it and deals with it by supplying and reinforcing the required information. A lack of knowledge can be localized by detailing it. But details can be identified in different ways depending on how the system has been built. In simplified form, the teaching consists of two blocks: a learning block and a block that checks knowledge.

The first block presents knowledge to the student dose by dose using some specific strategy, in either a linear or a network fashion. As the process advances the teaching system periodically switches to the knowledge-check function, which may use various mechanisms:

1. The teaching strategy does not change depending on the answers given, although correctness of the answers is checked. Traditional teaching systems use this scheme and alternative answers (one or more) are available for each question. The disadvantage of this solution is that questions must be formulated and answers defined very clearly and without ambiguity. It is hard to distinguish the meaning of the misunderstanding in the alternative answers, although this deficiency is surmountable in principle by increasing the number of test questions.

2. If the teaching strategy can change, then we have a situation where the learning process is controlled: the answer to check-questions is registered, content of the answers is analyzed, adaptation of teaching strategies is planned, and regulation is effected (a further portion of knowledge is provided, with the required level and content).

So, as well as offering a mechanical support for decision-making, EPSS is also a powerful tool for improving the efficiency of the automated systems of distance education, providing learning without supervision by a teacher, improving system management by strengthening support functions and enhancing the adaptive properties of the system to the requirements of a particular user.

**Prospects for MOOCs.** The world of higher education faces intensive challenges today: pressure on universities and their students to perform has increased at the same time as budgets have been cut. The correct reactions to this pressure are efficiency-gains, restructuring and innovation, but also greater flexibility.

In this context, the concept of smart education is gaining ground, often seen as a solution to the need to educate an increasing number of students within the existing financial constrains, and Open Educational Resources (OER) and Mass Open Online Courses (MOOCs) are increasingly viewed as an option by universities around the world. MOOCs allow students to choose their own learning trajectory when following the university courses. MESI is now establishing its own MOOCs platform: http://lms.mesi.ru.

Sources of knowledge and the operating tools for imparting it have changed dramatically. There is no longer a one-way traffic of knowledge transfer. Faculties and students are on equal terms in sharing their knowledge and creating new knowledge. At the same time, thanks to new educational technology, faculties can carry knowledge outside of the classroom, as in the case of MOOC. Business is also learning to accept a new demand for creativity and independent personalities.

**Conclusion.** Now days, it is hard to overestimate the role of information in social and economic development. The information technologies influence on the modern student significantly. The student has sufficient ICT competencies that allow him to easily handle new devices and web-services. A person who possesses ICT competences can use the information resource access more effectively for his education and profession. But the research results define a new problem in the socialization during the educational process.

The face to face knowledge communication is replaced by a Web resource. However, these web resources are not completely satisfy students. There are two ways to overcome this problem. One of them is obtaining the student's ICT competences. But they are skilled enough in ICT. The second way is updating of the IT, which student prefers (search engine). Meanwhile these technologies aren't aimed to educational and scientific tasks at all. We see this problem has not technological aspect either educational. This problem is in knowledge communication. The knowledge communications include the IT opportunities, which are popular in our time, but also the psychology issues such as communication face to face, confection between faculty and students.

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**Мета.** Дослідження перспектив застосування інформаційних і комунікаційних технологій у розвитку систем дистанційного (електронного) навчання (LMS), що реалізують індивідуальні траєкторії навчання студентів.

**Методика.** Дослідження ґрунтується на глибокому аналізі електронного навчання та працях провідних учених Макаренкової Є. [1] і Чистова Д. [2]. При розробці вимог до системи, що підтримує індивідуальні траєкторії навчання, використовувалися результати дослідження психології освіти, що описують процес отримання нового знання від зародження ідеї до її формалізації. Досягнення психології повинні враховуватися у використанні системи підтримки прийняття рішень (DSS) як технології, що забезпечує індивідуальні траєкторії навчання.

**Результати.** Проаналізовані інформаційні й комунікаційні технології для навчання та управління освітою. Встановлено, що значний прогрес у розвитку освіти був досягнутий завдяки інформаційним і комунікаційним технологіям, проте залишилося безліч невикористаних можливостей для вдосконалення навчання для всіх зацікавлених сторін: суспільство, учні, викладачі. Аналіз практичного застосування інформаційних технологій DSS виявив, що їх застосування дозволяє розвивати LMS, що реалізовує індивідуальну траєкторію без додаткових фінансових витрат для студентів та викладачів.

**Наукова новизна.** Полягає в застосуванні досягнень у розробці DSS у вирішенні завдань електронного навчання з урахуванням психології освіти. У результаті дослідження були відкриті нові перспективи в розробці індивідуальних траєкторій.

**Практична значимість.** LMS розроблена з використанням технологій DSS, що враховують інтереси сторін, зацікавлених в електронному навчанні. Студенти отримують можливість навчання у зручному для них ритмі, з урахуванням їх успішності протягом семестру. Викладачі отримують гнучкий інструмент для індивідуального навчання студентів. Розвиток LMS університетові забезпечить додаткові конкурентні переваги на освітньому ринку.

**Ключові слова:** *траєкторія індивідуального навчання, масовий відкритий он-лайн курс (MOOCs), системи підтримки прийняття рішень (DSS), управління знаннями*

**Цель.** Исследование перспектив применения информационных и коммуникационных технологий в развитии систем дистанционного (электронного) обучения (LMS), реализующих индивидуальные траектории обучения студентов.

**Методика.** Исследование основывается на глубоком анализе электронного обучения и трудах ведущих ученых Макаренковой Е. [1] и Чистова Д. [2]. При разработке требований к системе, поддерживающей индивидуальные траектории обучения, использовались результаты исследования психологии образования, описывающие процесс приобретения нового знания от зарождения идеи до ее формализации. Достижения психологии должны учитываться в использовании системы поддержки принятия решений (DSS) в качестве технологии, обеспечивающей индивидуальные траектории обучения.

**Результаты.** Проанализированы информационные и коммуникационные технологии для обучения и управления образованием. Установлено, что значительный прогресс в развитии образования был достигнут благодаря информационным и коммуникационным

технологиям, однако осталось множество неиспользованных возможностей для совершенствования обучения для всех заинтересованных сторон: общество, учащиеся, преподаватели. Анализ практического применения информационных технологий DSS выявил, что их применение позволяет развивать LMS, реализующую индивидуальную траекторию, без дополнительных финансовых расходов для студентов и преподавателей.

**Научная новизна**. Заключается в применении достижений в разработке DSS в решении задач электронного обучения с учетом психологии образования. В результате исследования были открыты новые перспективы в разработке индивидуальных траекторий.

**Практическая значимость**. LMS разработана с использованием технологий DSS, которая учитывает интересы заинтересованных сторон в электронном обучении. Студенты получают возможность обучения в удобном для них ритме, с учетом их успеваемости в течение семестра. Преподаватели получают гибкий инструмент для индивидуального обучения студентов. Развитие LMS университету обеспечит дополнительные конкурентные преимущества на образовательном рынке.

**Ключевые слова:** *траектория индивидуального обучения, массовый открытый онлайн курс (MOOCs), системы поддержки принятия решений (DSS), управление знаниями*

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# DEVELOPMENT OF AN INTERNET MARKETING PLAN BY VAT "ROSSELHOZBANK"

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# РОЗРОБКА ПЛАНУ ІНТЕРНЕТ-МАРКЕТИНГУ ВАТ „РОССЕЛЬХОЗБАНК"

В связи с ростом постиндустриальной экономики и развитием информационного общества, а также вызванным глобализацией усилением банковской конкуренции на традиционном рынке, возрастает актуальность использования банками современных информационных технологий как для привлечения клиентов в традиционные банковские отделения, так и для построения и активного использования электронного банковского бизнеса. В качестве необходимого инструмента решения данной проблемы выступает интернет-маркетинг, теоретический аппарат и инструментальные средства которого еще не достаточно полно проработаны.

**Цель.** Разработка рекомендаций по построению плана интернет-маркетинга в банковском секторе для повышения эффективности данного вида деятельности.

**Методика.** При решении поставленных задач использовались основные положения теории конкуренции и теории управления, методы осуществления маркетинговых исследований и маркетинговой диагностики.

**Результаты.** В целях наиболее полного использования возможностей интернет-маркетинга были разработаны практические рекомендации формирования и реализации плана интернет-маркетинга, в частности, разработана методика функционального моделирования плана интернет-маркетинга коммерческого банка на основе методологии IDEF0 с целью повышения эффективности управления планированием интернет-маркетинга на функциональном уровне.

**Практическая значимость.** Разработки, выполненные в данном исследовании, могут оказаться полезными не только для коммерческих банков, а и для множества коммерческих предприятий, имеющих собственные сайты, так как разработанный инструментарий маркетинговых исследований в Интернете является универсальным и не имеет строгих отраслевых ограничений. В свою очередь данный инструментарий является лишь частью общей методологии интернет-маркетинга и соответствующих ей инструментальных средств, которые экономической науке и прикладным специалистам еще только предстоит разработать.

**Ключевые слова:** *интернет-маркетинг, планирование, методика формирования плана, банковский сектор*

**Постановка проблемы.** В связи с ростом постиндустриальной экономики и развитием информационного общества, а также вызванный глобализацией и усилением банковской конкуренции на традиционном рынке, возрастает актуальность использования банками современных информационных технологий