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TECHNOLOGIES, SYSTEMS AND
APPLICATIONS
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Заюков І. В. ВИКОРИСТАННЯ EXCEL ЯК АЛЬТЕРНАТИВНОГО ПРОГРАМНОГО ЗАБЕЗПЕЧЕННЯ ДЛЯ БІЗНЕС-ПЛАНУВАННЯ ПРИ ПІДГОТОВЦІ СТУДЕНТІВ В ЗВО	265
Червяков К. В., Супруненко О. О. ПРОБЛЕМИ УПРАВЛІННЯ ПРОГРАМНИМИ ПРОЄКТАМИ В УМОВАХ БЕЗПЕРЕРВНОГО ПОСТАЧАННЯ.....	268
Секція 7. Інформаційні технології в освіті.....	271
Dyadun S. V., Timofeeva A. V. ANALYSIS OF THE CURRENT STATE AND WAYS TO SOLVE THE PROBLEMS OF INFORMATIZATION OF EDUCATION.....	272
Pavlenko M. P., Pavlenko L. V., Pavlenko Y. M. PROJECT-BASED LEARNING: AN ACTIVE PEDAGOGICAL APPROACH TO BUILD SOFT SKILLS IN COMPUTER SCIENCE GRADUATES.....	275
Shevchenko Lyudmila, Umanets Volodymyr, Rozputnia Bohdan INTEGRATING DALL-E ARTIFICIAL INTELLIGENCE INTO THE EDUCATIONAL PROCESS FOR DEVELOPING THE PROFESSIONAL COMPETENCIES OF DESIGNERS.....	278
Андрусяк В. М., Вовк Р. Б. ВИКОРИСТАННЯ ЧАТ-БОТІВ, ЯК СУЧАСНОГО ІНСТРУМЕНТУ КОМУНІКАЦІЇ ТА ПІДТРИМКИ В УНІВЕРСИТЕТСЬКОМУ СЕРЕДОВИЩІ.....	281
Бондаренко В. В. ІНФОРМАЦІЙНЕ ЗАБЕЗПЕЧЕННЯ ДІЯЛЬНОСТІ БАТЬКІВСЬКОГО КОМІТЕТУ	284
Голуб Д. А., Любченко К. М. ІНСТРУМЕНТАЛЬНО-КОНТРОЛЮЮЧА ПРОГРАМА З ГРАФІВ.....	287
Гук В. І., Голуб Д. А. ВИКОРИСТАННЯ СИСТЕМИ MAPLE ДЛЯ РОЗВ'ЯЗАННЯ ЗВИЧАЙНИХ ДИФЕРЕНЦІАЛЬНИХ РІВНЯНЬ.....	289
Лісецька І. С. ДОСВІД ВИКОРИСТАННЯ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ В ОСВІТНЬОМУ ПРОЦЕСІ НА КАФЕДРІ ДИТЯЧОЇ СТОМАТОЛОГІЇ ІФНМУ ..	294
Огребчук П. М., Кабак В. В. РОЗРОБКА ТА ДОСЛІДЖЕННЯ ІНТЕРАКТИВНОГО ІГРОВОГО ЗАСТОСУНКУ RUTHONIA QUEST ДЛЯ ВИВЧЕННЯ МОВИ RUTHON	297
Ройко Л. Л. РОЛЬ ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ ПРИ ВИВЧЕННІ ОСВІТНЬОГО КОМПОНЕНТА «МАТЕМАТИКА ТА СТАТИСТИКА ДЛЯ ЕКОНОМІСТІВ»	300

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PROJECT-BASED LEARNING: AN ACTIVE PEDAGOGICAL APPROACH TO BUILD SOFT SKILLS IN COMPUTER SCIENCE GRADUATES

Pavlenko M. P., Pavlenko L. V., Pavlenko Y. M.

Berdyansk State Pedagogical University

Abstract. Study of project-based learning for IT students. Team projects using collaboration tools improved soft skills such as communication and teamwork. Quantitative and qualitative data showed effectiveness over traditional methods in building key workplace skills.

With technology's exponential growth and central role across industries, interpersonal abilities like collaboration are critical for graduates entering the modern workplace. However, many computer students lack the proficiency in these soft skills that employers increasingly demand. The study explores an active pedagogical approach to effectively build these capabilities.

With technology underpinning virtually every industry and function today, computing graduates must have strong interpersonal skills in addition to their technical qualifications. However, empirical studies and employer surveys reveal significant gaps in the collaboration, problem solving, and communication skills of many graduates [1]. Active learning approaches, such as project-based education, aim to bridge this skill gap. By working in teams to complete meaningful tasks, students gain experiential learning in key soft skills required for real-world software development and technology work. This study examines the implementation of collaborative student projects that simulate IT work environments. Provides empirical evidence of the effectiveness of this pedagogical model in developing the human skills required for success in the digital workplace of the 21st century.

IT professionals need a mix of technical expertise and soft skills, such as communication, collaboration, critical thinking, and problem solving. However, many computer science graduates lack these interpersonal skills that are critical to success in the workplace. A survey by the Society for Human Resource Management found that almost 75% of organisations struggle to recruit suitable candidates due to deficiencies in critical thinking, problem solving, professionalism, and leadership [2]. Project-based pedagogy provides an active learning approach in which students gain experiential development of the soft skills required in real-world software development through collaborative team projects and technologies that facilitate group work. Studies show that this pedagogical style increases motivation, engagement, and skill development compared to traditional classroom models. The collaborative nature of project work helps students develop key workplace skills such as communication, teamwork, and project management, which are highly valued by employers [4], [5].

A formative pedagogical study was conducted with control and experimental groups of students who completed a network administration course [3]. The experimental group worked in teams to design, implement, and present server solutions through collaborative projects using modern teamwork platforms such as Trello, Zoom, and Slack. Mind mapping visualised project tasks and structure. Cloud-based boards enabled the creation of user stories, sprint planning, and work coordination. Videoconferencing facilitated regular meetings, brainstorming, and discussions. The team chat applications provided written communication and transparency. The control group worked individually using traditional methods. Standardised surveys measured changes in communication and teamwork skills. Quantitative analysis compared the results between groups using statistical tests. Qualitative data also assessed students' perceptions, motivation, and engagement.

Statistical analysis revealed significant gains in communication and teamwork skills for the experimental group compared to the control group. On average, project-based learning increased communication scores by 14% and teamwork scores by more than 20% compared to traditional individual work. Quantitative results suggest that collaborative projects, which simulate real-world software development, can effectively develop critical interpersonal skills such as coordination and communication. Qualitative findings also showed greater motivation, confidence and participation of students when working as a team to produce meaningful work. The students appreciated the use of popular and professionally used platforms for project coordination and team discussion. In general, the study provides strong empirical evidence that active, experiential learning through group project work successfully builds the soft skills critical for IT graduates to thrive in the modern digital workplace.

Although the results are promising, the study was limited to a single institution with a small sample size. Further research should replicate findings across educational contexts, technical disciplines, and workplace settings after graduation. Longitudinal data tracking post-graduation performance would provide additional insights. Larger sample sizes could increase the generalisability of the result. However, the paper provides initial evidence that collaborative project work can significantly improve IT students' interpersonal skills.

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