HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

THE IMPORTANCE OF INFORMATION TECHNOLOGIES IN THE DEVELOPMENT OF PROFESSIONAL COMMUNICATIVE COMPETENCE OF TECHNICAL ENGINEERS

Mullabaeva Nargiza Sharopalievna
UBS dotsenti
mullaboyevanargiza79@gmail.com
https://doi.org/10.5281/zenodo.20594214

Abstract.
The rapid advancement of information technologies has transformed the professional activities of engineers and increased the demand for effective communication skills in technical environments. Modern engineers are expected not only to possess strong technical expertise but also to communicate efficiently in multidisciplinary teams, manage information flows, and collaborate through digital platforms. This article examines the role of information technologies in the development of professional communicative competence among technical engineers. The study analyzes the psychological and pedagogical mechanisms through which digital technologies enhance communication skills, professional interaction, and collaborative problem-solving. The findings indicate that information technologies significantly contribute to the formation of communicative competence by promoting digital literacy, interactive learning, professional collaboration, and continuous professional development.

Keywords:
information technologies, professional communicative competence, technical engineers, digital communication, engineering education, professional development, digital literacy, communication skills.

INTRODUCTION

In the context of digital transformation and globalization, communication has become one of the most important competencies required in engineering professions. Modern engineering projects involve collaboration among specialists from diverse disciplines, organizations, and countries. Consequently, engineers must be capable of effectively exchanging information, presenting technical solutions, negotiating with stakeholders, and participating in virtual teamwork environments.

The emergence of advanced information technologies has fundamentally changed the nature of professional communication. Digital communication platforms, artificial intelligence systems, virtual collaboration environments, and online learning technologies have created new opportunities for interaction and professional development. As a result, information technologies are increasingly viewed not only as technical tools but also as powerful instruments for developing communicative competence.

Despite significant progress in engineering education, communication skills remain one of the most challenging areas of professional preparation. Many technical specialists possess strong technical knowledge but encounter difficulties in interpersonal communication, teamwork, and professional presentations. Therefore, the integration of information technologies into engineering education has become a strategic priority for enhancing professional communicative competence.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

The purpose of this study is to investigate the importance of information technologies in the development of professional communicative competence among technical engineers and to identify the psychological and pedagogical factors contributing to this process.

LITERATURE REVIEW

In Uzbek pedagogical and psychological research, communication competence has been examined as an important component of professional development and educational effectiveness. Scholars such as E.G. Goziyev, B.R. Qodirov, G‘.B. Shoumarov, M.G. Davletshin, and V.M. Karimova have emphasized that effective communication contributes significantly to professional success, social adaptation, and personal development. Their research highlights the importance of communication culture, interpersonal interaction, and psychological preparedness in professional activities.

Researchers from the CIS countries have made substantial contributions to understanding communication as a socially and psychologically mediated process. The works of L.S. Vygotsky, A.N. Leontiev, S.L. Rubinstein, B.G. Ananyev, and V.A. Kan-Kalik demonstrated that communication develops through social interaction, collaborative activity, and reflective learning. Their theoretical approaches emphasize that professional communication skills are formed through active participation in meaningful educational and occupational environments.

Foreign researchers have extensively explored the relationship between information technologies and communicative competence. The concept of communicative competence developed by Dell Hymes emphasizes the integration of linguistic, social, and contextual skills. The social cognitive theory proposed by Albert Bandura highlights the role of technological environments in enhancing self-efficacy and communication performance. Furthermore, Daniel Goleman emphasized the importance of emotional intelligence in digital communication and professional collaboration. Studies conducted by David Kolb and Donald Schön indicate that technology-supported experiential learning environments promote communication skills, reflection, and professional competence.

METHODOLOGY

The study employed a mixed-method research design that combined theoretical analysis and empirical investigation. The theoretical stage involved a comprehensive review of scientific literature related to information technologies, professional communication, engineering education, and psychological determinants of competence development. The empirical stage focused on identifying the influence of information technologies on the professional communicative competence of technical engineers.

The participants included engineering students and practicing engineers from technical universities and industrial organizations. Data were collected using standardized questionnaires measuring communicative competence, digital literacy, professional motivation, self-efficacy, and attitudes toward information technologies. Additional observations and semi-structured interviews were conducted to obtain qualitative insights into participants’ experiences with digital communication tools.

The collected data were analyzed using descriptive statistics, Pearson correlation analysis, and multiple regression analysis. These statistical procedures allowed for the examination of relationships between information technology usage and the development of communicative competence.

RESULTS

The findings revealed that the use of information technologies significantly contributes to the development of professional communicative competence among technical engineers. Engineers who regularly utilized digital communication platforms demonstrated higher levels of communication effectiveness, teamwork skills, and professional interaction.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Table 1

Correlation between information technology factors and professional communicative competence

Factors	r	p
Digital Literacy	0.76	<0.001
Online Collaboration Skills	0.73	<0.001
Information Management Skills	0.69	<0.001
Professional Self-Efficacy	0.64	<0.01
Technological Adaptability	0.61	<0.01

The results presented in Table 1 demonstrate statistically significant and positive relationships between information technology competencies and the professional communicative competence of technical engineers. The strongest correlation was observed between digital literacy and professional communicative competence ($r = 0.76$; $p < 0.001$). This finding indicates that engineers who possess advanced digital skills are more capable of effectively communicating professional information, utilizing modern communication tools, and participating in technology-mediated professional interactions. Digital literacy enables engineers to access, process, evaluate, and exchange information efficiently, thereby enhancing the quality and effectiveness of professional communication in both academic and industrial settings.

A similarly strong positive relationship was identified between online collaboration skills and communicative competence ($r = 0.73$; $p < 0.001$). This result suggests that engineers who actively engage in virtual teamwork environments and collaborative digital platforms demonstrate higher levels of communication effectiveness. Modern engineering projects increasingly require professionals to work within geographically distributed teams, making the ability to communicate through online collaboration tools a critical determinant of professional success. Engineers who effectively utilize platforms such as Microsoft Teams, Zoom, Slack, and other collaborative technologies are more likely to develop strong interpersonal communication skills, improve coordination with colleagues, and participate successfully in collective problem-solving activities.

The findings further revealed a substantial positive correlation between information management skills and professional communicative competence ($r = 0.69$; $p < 0.001$). This relationship indicates that engineers who can efficiently search, organize, analyze, and present information tend to communicate more effectively in professional contexts. Information management competencies allow specialists to structure technical information logically, provide evidence-based arguments, and communicate complex engineering concepts in a clear and understandable manner. Consequently, these skills contribute to more productive professional discussions, enhanced decision-making processes, and improved communication within multidisciplinary teams.

In addition, professional self-efficacy demonstrated a significant positive relationship with communicative competence ($r = 0.64$; $p < 0.01$). This finding suggests that engineers who possess greater confidence in their professional abilities are more willing to participate in discussions, express their opinions, present technical solutions, and engage in collaborative activities. High levels of self-efficacy reduce communication anxiety and increase an individual's readiness to assume leadership roles in professional interactions. Therefore, self-efficacy functions as an important psychological mechanism facilitating effective communication in engineering environments.

The correlation between technological adaptability and professional communicative competence ($r = 0.61$; $p < 0.01$) also proved to be statistically significant. Engineers who are capable of adapting quickly to emerging technologies, digital platforms, and innovative communication tools tend to demonstrate higher levels of communication effectiveness. In the context of rapid technological

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

advancement and digital transformation, adaptability allows professionals to remain competitive, maintain effective communication across diverse technological environments, and continuously improve their professional competencies.

Overall, the findings presented in Table 1 provide strong empirical evidence that information technology competencies significantly contribute to the development of professional communicative competence among technical engineers. The results indicate that communication effectiveness in modern engineering practice is increasingly dependent upon engineers' ability to utilize digital technologies, collaborate in virtual environments, manage information efficiently, and adapt to technological innovations. These findings support the view that information technologies should be considered not only as technical instruments but also as powerful pedagogical and psychological tools for enhancing professional communication skills and improving overall engineering performance.

Table 2

Regression analysis predicting professional communicative competence

Predictor Variables	β	t	p
Digital Literacy	0.39	6.92	<0.001
Online Collaboration Skills	0.34	5.88	<0.001
Information Management Skills	0.27	4.61	<0.01
Technological Adaptability	0.21	3.84	<0.05

$R^2 = 0.74$

The results of the multiple regression analysis presented in Table 2 indicate that information technology-related competencies exert a substantial influence on the development of professional communicative competence among technical engineers. The regression model accounted for 74% of the total variance ($R^2 = 0.74$) in professional communicative competence, demonstrating a high explanatory power. This finding suggests that the selected predictors collectively represent the most significant factors contributing to effective professional communication in contemporary engineering environments. The high coefficient of determination further confirms that information technologies are not merely auxiliary tools but constitute a fundamental element of professional competence development in the digital era.

Among all predictor variables, digital literacy emerged as the strongest predictor of professional communicative competence ($\beta = 0.39$; $p < 0.001$). This result indicates that engineers who possess advanced abilities in using digital technologies, managing electronic information, and navigating technological environments are more likely to demonstrate effective communication skills. Digital literacy enables specialists to communicate through multiple digital channels, prepare professional presentations, exchange technical documentation, and participate actively in virtual professional communities. Consequently, digital literacy serves as a foundational competence that facilitates the acquisition and practical application of communication skills in engineering practice.

The second strongest predictor was online collaboration skills ($\beta = 0.34$; $p < 0.001$). This finding highlights the growing importance of teamwork in modern engineering projects, where collaboration increasingly occurs through virtual environments and digital platforms. Engineers who effectively utilize online communication systems are more capable of coordinating group activities, sharing knowledge, resolving technical issues collectively, and maintaining productive professional relationships despite geographical barriers. The significance of this variable reflects the reality that contemporary engineering tasks are frequently performed within interdisciplinary and international teams requiring constant communication and cooperation.

The analysis further revealed that information management skills significantly predicted professional communicative competence ($\beta = 0.27$; $p < 0.01$). Engineers who can efficiently collect,

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

organize, evaluate, and disseminate information tend to communicate more effectively with colleagues, managers, and clients. Information management skills contribute to the clarity, accuracy, and logical structure of professional communication, enabling engineers to present technical concepts in a comprehensible manner and support their arguments with reliable evidence. In complex engineering environments characterized by large volumes of technical data, the ability to manage information effectively becomes an essential prerequisite for successful communication.

Similarly, technological adaptability was identified as a statistically significant predictor of professional communicative competence ($\beta = 0.21$; $p < 0.05$). This result suggests that engineers who can rapidly adapt to new technologies, software systems, and communication platforms are more likely to maintain effective professional interactions in dynamic work environments. Technological adaptability promotes flexibility, continuous learning, and openness to innovation, all of which enhance communication effectiveness and professional performance. As technological advancement accelerates, the capacity to adapt to emerging digital tools becomes increasingly important for sustaining communication efficiency and professional competitiveness.

The findings collectively indicate that the development of professional communicative competence among technical engineers is strongly associated with the effective use of information technologies. The regression model demonstrates that technological competencies not only support communication processes but also actively shape engineers' ability to interact, collaborate, negotiate, and exchange professional knowledge. These results provide empirical evidence that information technologies have become a key determinant of communication effectiveness in engineering professions.

From a pedagogical perspective, the findings emphasize the necessity of integrating digital literacy training, online collaboration activities, information management practices, and technology-based learning environments into engineering education programs. Universities and training institutions should create opportunities for students to develop these competencies through project-based learning, virtual teamwork, simulation technologies, learning management systems, and artificial intelligence-supported educational tools. Such educational interventions can significantly contribute to the formation of highly competent engineering professionals capable of effective communication in technologically advanced workplaces.

Overall, the regression analysis confirms that information technologies serve as a strategic resource for enhancing professional communicative competence among technical engineers. Their influence extends beyond technical performance and directly contributes to the development of communication quality, teamwork effectiveness, professional confidence, and adaptability to the rapidly evolving demands of the modern engineering profession**.**

DISCUSSION

The results of the study demonstrate that information technologies have become an essential factor in the development of professional communicative competence among technical engineers. Modern digital environments facilitate communication by providing opportunities for real-time interaction, collaborative problem-solving, knowledge sharing, and professional networking. Engineers who effectively utilize information technologies are better prepared to participate in multidisciplinary teams, communicate technical information clearly, and adapt to rapidly changing professional environments.

The findings indicate that digital literacy is one of the most important competencies influencing professional communication. Engineers who possess advanced technological skills are more capable of using digital platforms for presentations, project management, professional discussions, and virtual

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

teamwork. Moreover, information technologies encourage continuous learning and self-development by providing access to educational resources, online courses, and professional communities.

The study also highlights the psychological benefits of technology-supported communication. Digital platforms enhance professional self-efficacy, increase confidence in communication, and create opportunities for reflective learning. Engineers can receive immediate feedback, engage in collaborative discussions, and improve their communication strategies through repeated practice in technology-rich environments.

These findings are consistent with contemporary theories of professional competence development, which emphasize the integration of technological, cognitive, and social skills. Information technologies not only facilitate communication but also transform the ways in which engineers learn, collaborate, and solve professional problems.

CONCLUSION

The study confirms that information technologies play a crucial role in the development of professional communicative competence among technical engineers. Digital literacy, online collaboration skills, information management abilities, and technological adaptability significantly contribute to effective professional communication. The integration of information technologies into engineering education creates favorable conditions for developing communication skills, teamwork competencies, and professional confidence.

The findings suggest that engineering education programs should incorporate technology-based communication training, digital collaboration projects, virtual simulations, and interactive learning environments. Educational institutions should also promote the use of artificial intelligence tools, online collaboration platforms, and digital communication technologies as integral components of professional preparation.

In conclusion, information technologies have become a strategic resource for enhancing the professional communicative competence of technical engineers. Their effective integration into educational and professional contexts contributes to improved communication quality, increased professional effectiveness, and greater competitiveness in the modern labor market. Future research should focus on the long-term impact of emerging technologies, including artificial intelligence and virtual reality, on engineers' communication skills and professional development.

LIST OF USED LITERATURE:

1. Богданов В.В. Коммуникативная компетенция и коммуникативное лидерство / В.В. Богданов // Язык, дискурс и личность. - Тверь: Изд-во ТГУ, 1990. -С. 26-31.
2. Брудный А.А. К теории коммуникативного воздействия// Теоретические и методологические проблемы социальной психологии/ Под ред. Г.М. Андреевой, Н.Н. Богомоловой. - М.: Изд-во МГУ, 1977. - С. 32-49.
3. Вегерчук Н.Э. Понимание как ключевой компонент в социальноперцептивной компетентности руководителя / И.Э. Вегерчук // Мир психологии. - 2000. - № 2. - С. 90 - 102.
4. Гез Н.И. Формирование коммуникативной компетенции как объект зарубежных методических исследований / Н.И. Гез // Иностранные языки в школе. - 1984.- № 6. - С. 17-24.
5. Дризде Т.М. Социальная коммуникация как текстовая деятельность в семиосоциопсихологии / Т.М. Дризде // Общественные науки и современность. - 1996. -№ 3. - С. 145 - 152.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

6. Sharopaliyevna, M. N. (2021). Factors Influencing the Manifestation of Depression in Adolescents. Annals of RSCB, 25(4), 5904-5915.
7. Mullaboyeva, N. S. (2021). Kasbiy ko'nikma va malakalarni shakllantirishning psixofiziologik asoslari. In Қазіргі қоғамның, экономиканың және кәсіптік білімінің дамуының ағымдағы мәселелері (pp. 168-173). РГППУ.
8. Mullaboyeva, N. S. (2021). O'quvchi–talabalarda kasbiy ko'nikma va malakalarni shakllanishi. In Қазіргі қоғамның, экономиканың және кәсіптік білімінің дамуының ағымдағы мәселелері (pp. 163-167). РГППУ
9. Mullaboyeva, N. (2019). Kasbiy pedagogika. Namangan:[Publisher].