

Developing Students' English Written Production Through Technology-Enhanced TPACK-Based Instruction

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Abstract: This article describes the conceptual essence of integration in higher teacher education and to identify effective approaches to integrating the pedagogical, psychological, methodological, and subject-specific components of educational programmes designed for prospective teachers. The article deals with the development of integrated educational and professionally oriented tasks that can be implemented in teacher training programmes, with particular reference to the specialization in English Language Teaching, as well as TPACK model integration.

Keywords: Integration, teaching environments, writing skills, digital technologies, writing instruction, TPACK, English.

Introduction: A number of international studies have addressed the integration of subject-specific, pedagogical, and technological components in the teaching of particular disciplines through the TPACK (Technological Pedagogical Content Knowledge) framework. Within this framework, CK (Content Knowledge) refers to knowledge of the subject matter; PK (Pedagogical Knowledge) refers to knowledge of teaching and learning processes and appropriate pedagogical approaches; and TK (Technological Knowledge) refers to knowledge of traditional and contemporary educational technologies.

It should be noted that challenges associated with the preparation of prospective teachers are also encountered by educators at higher education institutions internationally. For example, N. Harr, A. Eichler, and A. Renkl, drawing on and synthesizing teacher education practices across different countries, conclude that students traditionally study pedagogy, psychology, and their subject specialization as separate disciplines. Such fragmentation may result in insufficient integration and limited practical application

of psychological and pedagogical knowledge. In their study, the authors present the results of an experiment aimed at integrating psychological and pedagogical knowledge into mathematics instruction at universities in Germany and the United States. During the experiment, prospective mathematics teachers were divided into three groups. The first group consisted of students who studied pedagogy, psychology, and mathematics teaching methodology separately, without establishing systematic connections among these areas. The second group followed the conventional curriculum as well; however, when discussing issues related to mathematics teaching, students were assigned tasks requiring them to independently apply previously acquired knowledge of pedagogy and psychology. In the third group, the relevant disciplines were taught in an integrated manner according to a specially designed curriculum. Nevertheless, the integrated approach resulted in a greater cognitive load for students and created administrative challenges associated with curriculum restructuring. In this regard, the authors argue that integration models that do not require radical

transformations of the educational process may offer greater potential [5]. However, their study does not specify concrete mechanisms for incorporating psychological and pedagogical components into the methodological component in order to optimize teacher education. We therefore assume that contemporary educational research has yet to provide a definitive solution to this issue.

LITERATURE REVIEW

The concept of integration in education is not new. L. A. Ermakova [6] argues that the idea of integration was first advanced by the prominent educational theorist J. A. Comenius, who maintained that the learning process should reflect the same interrelationships that exist among the phenomena and objects being taught [7]. K. D. Ushinsky, widely regarded as a seminal figure in Russian pedagogy, emphasized the necessity of developing learners' holistic understanding of the surrounding world, ensuring continuity in the content of academic subjects, and drawing upon knowledge previously acquired in other disciplines when consolidating new learning material [8].

A number of contemporary studies provide historical reviews and systematizations of integration-based concepts developed during the nineteenth and twentieth centuries. O. I. Nagel developed a classification of research incorporating ideas of integration according to the type of scholarly work produced: integrative pedagogical concepts; theories of educational integration; theories incorporating an integrative component; educational approaches based on integration; and integrative pedagogical studies concerned with the teaching of particular subjects and the education of specific categories of learners [8]. B. A. Zhekibaeva and A. D. Kalimova systematized relevant studies according to the fields of knowledge within which they were conducted, including philosophy, psychophysiology, psychology, and higher education didactics [9]. A. D. Kalimova, G. K. Bushueva, and G. K. Baizhunusova examined in detail the stages in the emergence and development of integration in education [10]. Thus, the historical dimension of integration has been examined extensively in contemporary scholarly literature. In one form or another, the principle of integration has been implemented in education since the seventeenth century.

DISCUSSION

Thus, despite the substantial body of theoretical research devoted to integration, however, there is no universally accepted interpretation of this concept in the scholarly literature. E. V. Kondratenko considers integration to be a system-forming factor in the development of the pedagogical culture of the contemporary teacher, as well as an indicator of the systematic, internally consistent, and scientific nature of pedagogical knowledge, thereby ensuring the integrity of the teacher's professional preparation [11]. M. S. Zavyalova and M. N. Razdobarova further specify that the integrity of educational content is achieved through the establishment of intra- and interdisciplinary relationships [12]. O. V. Oshchepkova and Yu. V. Blagov, however, argue that the establishment of interdisciplinary links does not in itself signify the successful implementation of integration. Integration involves not merely applying the content of one subject within another, but also the syncretic combination of disparate components of individual disciplines into a unified whole on the basis of common educational goals and objectives [13]. L. I. Gritsenko expresses a similar view in summarizing different approaches to the interpretation of integration. The author notes that understanding integration simply as the accumulation of knowledge derived from different disciplines is superficial and emphasizes that integration is not merely the combination of individual components of educational content but rather a means of resolving contradictions that cannot be adequately addressed within the framework of a single discipline [14]. M. V. Krulekht further observes that integration results in the transformation of quantitative changes into qualitative ones [15].

Pedagogical integration as a scholarly category can therefore be conceptualized not only as a process of establishing relationships among existing objects and constructing a new holistic system but also as a principle for modernizing pedagogical theory and practice. We share R. V. Stepanets's view that integration encompasses both the unification of knowledge and activities that share a common foundation and the design and implementation of the content of a unified educational domain, individual academic disciplines, organizational forms, teaching methods and tools, and modes of activity which, only

when considered in combination, can contribute to the harmonious development of the future graduate's personality [18].

A. V. Koklevsky concludes that integration coordinates all components of the educational process in a teacher-training university and ensures substantive and technological interconnections between the disciplines included in the curriculum, the content of future professional activity, and the technologies employed in solving professional tasks [19]. Accordingly, in the context of teacher education, we understand integration as a means of developing students' readiness and ability to synthesize and apply theoretical knowledge acquired within pedagogical, psychological, methodological, and subject-specific modules to authentic pedagogical situations arising in educational practice.

Furthermore, according to R. V. Stepanets, integration performs several additional functions: structural, methodological and worldview-forming, logical-developmental, motivational, and culture-forming functions.

The structural function involves establishing relationships among the constituent units of the educational process when structuring learning content.

The methodological and worldview-forming function refers to the formation of learners' conception of the world through the integration of rational-scientific knowledge and irrational-spiritual experience.

The logical-developmental function is realized through the integrated application of various forms and techniques of verbal and cognitive activity.

The motivational function involves creating contradictions in the process of acquiring knowledge that function as driving forces of the pedagogical process.

The culture-forming function is realized by introducing learners to the cultural space through familiarization with cultural codes in the process of engaging with "texts of culture" [20].

Having identified the essence and significance of integration, it is necessary to consider how different components of the curriculum can be integrated into the teaching process so that all the functions described above can be fully realized. Most existing publications

address only individual aspects of the implementation of integration in education. Drawing on the research of M. N. Berulava [20], E. V. Chukhina [19] identifies three levels of interaction among academic disciplines. The first is the level of interdisciplinary connections, at which only methodological or instructional tools are assimilated while individual disciplines retain their autonomy. The second is the level of didactic synthesis, at which integration is implemented on the basis of one of the disciplines, although each discipline retains its status and conceptual foundations. The third is the level of integrity, which involves the emergence of a new academic discipline of an integrative nature. E. V. Moskalenko and V. F. Morskova likewise distinguish three levels of integration. At the first level, integration occurs at isolated points without a common logical and content-based foundation. At the second level, such a logical and content-based foundation emerges, and integration is implemented along thematic lines. At the third level, it becomes possible to speak of a synthesis of different components of the educational process and the formation of a new holistic entity [21]. As can be seen, these levels progress from relatively simple forms of integration already familiar within educational practice toward the development of qualitatively new and distinctive educational structures.

E. F. Matveeva, N. Yu. Pikulina, and M. V. Zueva describe their experience of implementing second-level integration between pedagogy and psychology, on the one hand, and chemistry teaching methodology, on the other. Their approach is based on identifying common themes across these disciplines, including requirements for the contemporary lesson, technologies for conducting different types of lessons, methods for selecting appropriate instructional methods and didactic resources, strategies for enhancing learners' engagement, and the role of the teacher in the educational process. The authors propose revisiting issues previously studied within the didactics course during classes in subject-specific teaching methodology [22]. S. N. Sirenko describes the experience of Maxim Tank Belarusian State Pedagogical University in applying the principle of interdisciplinary interaction at the third level of integration in order to modernize the pedagogical preparation of prospective teachers. In this case, interdisciplinarity is implemented through the

introduction of new integrated courses into teacher-education curricula, including Fundamentals of Psychology and Pedagogy, Innovative Practices in Education, Media Pedagogy and Digital Didactics, and Professional and Personal Development of the Teacher. It also involves establishing an interdisciplinary student research laboratory in which students can gain practical experience in designing interdisciplinary projects for school learners [25]. We consider the inclusion of courses related to innovative and digital technologies in teacher-education curricula to be an appropriate response to contemporary educational challenges.

Y. Minsin and Y. Wei investigated the factors influencing the successful implementation of the TPACK framework in higher education institutions in Guizhou Province, China. Through interviews with teachers demonstrating different levels of TPACK proficiency, they identified five key factors: the affordances of the educational environment, teachers' subject-matter competence, teaching experience, professional development, and motivation to use digital technologies. The researchers conclude that professional development courses should be organized to enable teachers to select and apply digital technologies appropriately in their pedagogical practice [26]. E. Ifinedo and M. Kankaanranta further clarify that the components of the TPACK framework overlap, and that their intersections generate new integrated domains of knowledge, such as knowledge of how to select an appropriate digital technology for explaining a specific element of subject content. The authors classified the factors influencing successful TPACK implementation into three levels: the macro level, encompassing national education policy; the meso level, referring to the capacities and resources of a particular school's digital educational environment; and the micro level, relating to the classroom environment.

Nevertheless, teachers encounter challenges at each of the identified levels. The authors also propose strategies for addressing these difficulties. For example, school administrations may seek sponsorship to acquire the necessary digital equipment, while teachers may encourage learners to bring their own digital devices to class. It may be assumed that similar difficulties are encountered by teachers not only in Nigeria but also in other countries; consequently, the

search for effective solutions to these challenges remains relevant. Some researchers have examined the application of integration specifically in foreign language education. Foreign language learning based on interdisciplinary integration facilitates the development of a holistic linguistic and conceptual picture of the world and promotes an understanding of the interdependence of phenomena in science, society, and nature. S. S. Ignatova explains that foreign language education has considerable integrative potential because a foreign language can function not only as the object and goal of instruction but also as a means of developing various competencies.

The latter frequently presents significant difficulties because foreign language teachers rarely possess sufficient expertise in the content of the target subject, while subject teachers may lack adequate foreign language proficiency. In domestic teacher education, this challenge is addressed through the development of dual-profile bachelor's degree programs in which students simultaneously specialize in a particular subject and a foreign language, for example, history and English.

CONCLUSION

Thus, the disciplines comprising the psychological-pedagogical and subject-methodological modules of pre-service foreign language teacher education possess considerable potential for integration at various levels: at specific points of intersection, along thematic lines, and through the synthesis of different components. The integration of these modules constitutes an essential prerequisite for preparing students for independent professional practice. The complexity of implementing such integration stems from the fact that the instructors responsible for teaching the disciplines within these modules often belong to different academic departments. Therefore, a promising direction for further research is to identify effective forms of interdisciplinary collaboration and to develop mechanisms for organizing teamwork among all educators involved in delivering the professional modules within a particular educational programme.

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