

## Artículo de Revisión

### *The role of information and communication technologies in personalised learning: Opportunities and challenges in higher education*

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## Abstract

Nowadays, the ICTS have performed an essential position withinside the improvement of the sports that humanity consists of out on an everyday basis. Due to the devastation resulting from the latest activities of new year's; pandemics, armed conflicts, etc., The ICTS have emerge as more and more essential in better schooling institutions. The ICTs had been delivered with extra impetus in better schooling institutions, making them dynamic and adapting to the desires of college students. However, while studying the have an effect on that ICTS have at the personalization of college students' getting to know, nice and poor factors stand out, which have been addressed in numerous preceding studies. It is for that reason that the existing bibliographic article become carried out, so as to investigate the formerly offered procedures and to determine with extra on centration, the nice and poor factors that they have an effect on of ICTs at the personalization of Learning in college students brings with it. In addition to ponder the demanding situations which might be foreseen withinside the destiny withinside the academic context, with regards to the getting to know and permanence of college students. This painting contemplates a broad-spectrum panorama, regarding instructors and college students of the 0.33 level, who determine as non-stop contributors of the virtual and current era.

**Keywords:** ICTs (Information and Communication Technologies); Higher Education; Personalization of Learning; Educational Challenges.

## Resumen

Hoy en día, las ICTS han desempeñado un papel esencial dentro de la mejora de los deportes que componen la humanidad en el día a día. Sin embargo, al estudiar el efecto de las TIC en la personalización del conocimiento de los estudiantes universitarios, se destacan los factores agradables y malos, que se han abordado en numerosos estudios anteriores. Es por ello que se procede a la realización del artículo bibliográfico existente, con el fin de indagar en los procedimientos anteriormente ofrecidos y determinar con más atención, los factores positivos y negativos que tienen un efecto de las TIC en la personalización del aprendizaje en los estudiantes universitarios. Además de ponderar las situaciones exigentes que se pueden vislumbrar dentro del destino dentro del contexto académico, en lo que se refiere al conocimiento y permanencia de los estudiantes universitarios. Esta pintura contempla un panorama de amplio espectro, en lo que respecta a instructores y estudiantes universitarios del nivel 0,33, quienes determinan como contribuyentes ininterrumpidos de la era virtual y actual.

**Palabras clave:** TIC (Tecnologías de la Información y la Comunicación); Educación Superior; Personalización del Aprendizaje; Desafíos Educativos.

## 1. INTRODUCTION

Information and Communication Technologies (ICT) revolutionize diverse components of human existence, which include schooling. In the college context, those technology permit the implementation of extra bendy mastering strategies tailor-made to person scholar needs, a technique called personalised mastering. Personalized mastering refers back to the cappotential to evolve the instructional technique to every scholar's characteristics, interests, and pace, bearing in mind more engagement and stepped forward instructional performance.

Since the starting place of humanity, interest has been an innate function of people, one which has allowed for widespread strides at the route of evolution. This fine has led humanity to usually enhance over the years, designing equipment that simplify and simplicity their paintings. Human evolution is not anything

extra than a huge compilation of all of the occasions which have formed the society wherein we develop, with widespread and consequential adjustments which have contributed to our survival and adaptableness to regular adjustments.

Historians argue that humanity has controlled to navigate unfavourable situations, main to the development of the fine of existence we see today. However, producing a chief extrade includes a model period, which, relying on the convenience provided via way of means of the brand-new device or methodology, can both make bigger or shorten. Currently, the combination of statistics and verbal exchange technology in college-stage schooling has generated great expectations. While it gives ease, it additionally includes a model technique, distinguishing people who can adapt. As the technological spectrum grows exponentially and integrates into all human activities—from examine to paintings to home—the best manner to manage is via way of means of adapting to the adjustments it introduces.

In current times, because of worldwide events, statistics and communicate technology have become the tide of their favor. People who formerly operated inside a recurring version located themselves obligated to behavior their paintings and research via technological gear. Based at the aforementioned, this newsletter affords numerous epistemological techniques from exceptional authors who've addressed the have an impact on of statistics and communicate technology, particularly in the context of education, with a purposeful recognition at the college environment.

Personalized getting to know via ICT is primarily based totally on the use of virtual gear that facilitate the advent of interactive, accessible, and collaborative getting to know environments. This consists of on line getting to know platforms, academic apps, simulations, social networks, and different technology that permit college students to get admission to customized academic resources, take part in interactive activities, and get hold of immediate feedback.

However, imposing ICT in customized getting to know additionally affords tremendous challenges, together with the want for ok technological infrastructure, instructor training, and fairness in get admission to to those technology. These elements should be cautiously taken into consideration to maximise the wonderful effect of ICT on college education.

The goal of this observe is to research the have an impact on of Information and Communication Technologies (ICT) on customized getting to know withinside the college context, figuring out the possibilities, challenges, and techniques that could decorate academic improvement tailor-made to person pupil needs. The query guiding our studies is: How do Information and Communication Technologies (ICT) have an effect on customized getting to know withinside the college context, and what are the primary obstacles and possibilities found in this process?.

## 2. METHODOLOGY

**Information Collection:** To behavior this bibliographic study, an exhaustive look for documented records changed into achieved in the technological repositories of journals consisting of Scielo, Scopus, PubMed, and Web of Science. Using key phrases consisting of better education, learning, technology, technological tools, notion of technology, use of technology, records age, amongst others, files have been acquired that still addressed the provided subject matter and have been taken into consideration applicable because of the recency in their records, categorizing them as wonderful for the remedy of the provided subject matter.

**Information Extraction:** For the clean and concise extraction of records, parameters have been set to figure works that have been applicable to the particular subject matter at hand. With the layout and implementation of a evaluate matrix for literary works, the important records changed into recorded to generate the existing article. Special care changed into excited by files that did now no longer offer dependable and correct records at the provided subject matter. The parameters mounted for acquiring dependable records covered the compatibility among the goals of this newsletter and people referenced, the technique used, the derived effects, and broadly speaking the conclusions reached thru preceding research. The qualitative synthesis technique additionally assisted in figuring out sequences and directives

from the accumulated records, especially focusing at the have an effect on that conversation and records technology have at the personalization of learning, with a focal point at the college pupil group.

Synthesis of Results: To synthesize the acquired outcomes after matrix comparison, it turned into vital to combine and cross-evaluate the conclusions provided withinside the decided on articles. This method allowed for the identity of topics that shared the essence of the have a look at and differentiated the methodological viewpoints recorded through different authors. Additionally, unique interest turned into given to files that worried the usage of technological tools, which includes AI.

Research Demarcation: To make sure the preferred effectiveness of the have a look at, inherent barriers had been taken into consideration to save you undesired extension. The improvement of this paintings tested the convenience and availability of get entry to numerous statistics sources, databases, and information of preceding research, which enabled the collection of a big quantity of statistics. However, without delimiting the have a look at, the excellent of the acquired outcomes might have been reduced. Therefore, right boundary demarcation turned into essential to preserving the instructional excellent of the have a look at. Initially, the statistics delimitation centered on currently posted research, as they provided modern statistics reflecting the contemporary fact of the academic field. Since the maximum applicable occasions had been located in the open c programming language from 2019 to the present, statistics from the ultimate 5 years turned into gathered. Nonetheless, research unrelated to the have an impact on of ICTs at the personalization of college students' getting to know had been excluded, as additionally they yielded outcomes on subjects like telecommuting for the duration of the selected time frame.

Since the have a look at centered on a selected experimental unit, research that did now no longer adhere to this unit had been excluded. As ICTs have impacted all instructional levels (number one, secondary, and college), the accrued statistics protected those 3 areas. However, the experimental unit of the have a look at turned into particularly the college community. Lastly, to preserve the essence of the have a look at, the studies demarcation centered specially on files that did now no longer encompass number one statistics and had been evolved beneathneath the identical methodology.

### 3. RESULTS

To reap a concrete dissertation at the have an impact on of enforcing communique and statistics technology withinside the personalization of gaining knowledge of in the college context, a documentary contrast matrix changed into designed and implemented, in which the formerly decided on research have been placed. Out of a complete of 15 articles addressing the aforementioned topic, a giant quantity of statistics sharing the identical goal changed into gathered. The have an impact on that the usage of statistics and communique technology promotes for the personalization of gaining knowledge of some of the college look at organization is evident, because it surely represents a higher manner to obtain better ranges of knowledge.

To attain those findings, the articles underwent a radical analysis, from which crucial statistics complementing the course of the look at changed into highlighted, at some point of the usage of the matrix contrast provided below. The matrix contrast of documented statistics proves to be a completely diffused and flexible device for undertaking those sorts of research, because it permits for a well-based and prepared contrast of each goal and subjective viewpoints taken into consideration with the aid of using diverse authors, hence setting up the stable foundations of the existing research. Below is the matrix contrast performed regarding the expected topic:

**Table 1.**

Information Documentation Matrix Analysis.

No.	Title	Author(s)	Year	Abstract	DOI
1	Artificial Intelligence and its Implications in Higher Education	Fernández, Yolvi Fernández, Luis Aburto, Luzmila	2019	This article gives the brand new demanding situations that universities have to face with the intrusion of era and the blessings it brings to customized learning.	10.20511/pyr2019
2	Preparing Students for Generation Z: Considerations on 3D Printing Curriculum TT - Getting Ready for Generation Z Students - Considerations on 3D	Popescu, Diana Popa, Diana Cotet, Beatrice	2019	The authors monitor that customized gaining knowledge of makes a speciality of instructors being a part of Generation Z or digital, in order that training may be stronger via feedback.	10.20511/pyr2019
3	The Challenge of New Technologies: The Use of the Virtual Classroom and its Influence on Academic Performance	Gómez, Katherine	2019	Katherine Gómez explains that the affect of technology withinside the college context encourages instructors to have extra updated information and layout extra personalised methodologies for students.	10.33936/rehusov4i3.2136
4	Problem Solving with Technology in a Collaborative Learning Environment using Wiki in Secondary Education	Calle-Álvarez, Gerzon Yair Agudelo-Correa, Iván Darío	2019	The have a look at targets to symbolize the procedure that better schooling college students use to remedy issues with era in a collaborative getting to know surroundings supported through wiki.	10.22335/rlct.v11i2.876
5	Technological Tools in the Teaching-Learning Process in Higher Education Students	Molinero, María del Carmen Chavez Morales, Ubaldo	2019	The goal of this paintings become to analyze which technological gear are maximum utilized by college college students at a better schooling group and to pick out how they affect their instructional process.	10.23913/ride.v10i19
6	Higher Education in Blended Modality: Strengths and Weaknesses of its Implementation	Benítez González, MC	2019	This article analyzes the strengths and weaknesses of enforcing better schooling in a combined modality via using ICT and the Internet.	10.18004/ucsa/2409-8752/2019
7	TPACK Model: A Means to Innovate the Educational Process Considering Data Science and Machine Learning?	Salas-Rueda, Ricardo Adán	2019	This examine demonstrates that the outcomes of system studying (50%, 60%, and 70% training) permit us to verify that the software of facts and conversation technology improves the teaching-studying process.	10.22201/enesl.20078064e.2018.19.67511

8	IMPACT OF TECHNOLOGY USE ON THE TEACHING-LEARNING PROCESS OF INTEGRAL CALCULUS	Villena Muñoz, M Rivas Maldonado, N.	2019	Villena Muñoz and Rivas Ronaldo proven that the teaching-studying manner is dynamic, and integrating statistics and verbal exchange technology is the day by day mission for instructors and students.	1990-8644
9	Integration of ICT to Improve EFL Students' Skills in Vulnerable Communities	Roys Romero, Nancy Rosa	2019	This article identifies the constraints and effect of integrating facts and conversation technologies (ICT) withinside the school room to enhance students' skills.	10.18634/sophiaj.15v.2i.770
10	Evaluation of Student Perception Regarding the Use of the Moodle Platform from a TAM Perspective	Bedregal, Norka Cornejo, Víctor Tupacyupanqui, Doris Flores, Sidanelia	2019	The authors of this text concluded that using statistics and communicate technology in academic establishments has emerge as sizeable in latest years, making it important to degree their effect on pedagogical processes.	N/A
11	Quantification of the Influence of Smartphone Use on Practical Learning in Chemical Engineering	Pratto Burgos, Martin	2019	It become found that the usage of smartphones allowed maximum college students to attain ratings among 60% and 79%, surpassing the minimal passing threshold.	10.24215/18509959.24.e05
12	SCIENCE-TECHNOLOGY-SOCIETY EDUCATION: A METHODOLOGY FOR 21st-CENTURY TEACHERS	Rodríguez Morales, Alina	2019	Rodríguez Alina demonstrates that the creation of data and communicate equipment has a full-size effect on college students withinside the chemical sciences pedagogy program.	conrado.ucf.edu.cu/index.php/conrado
13	INVERTED LEARNING AS AN APPROACH TO UNIVERSITY EDUCATIONAL QUALITY IN ECUADOR	Aycart Carrasco, Francesco	2019	This paintings argues that technology have actively disrupted the world, producing new verbal exchange and studying dynamics for education. In the twenty first century, it stays a mission and a vital lifestyle for individuals who organize, facilitate, and assemble the know-how required via way of means of applications and society.	conrado.ucf.edu.cu/index.php/conrado
14	Cognitive Load and Learning with ICT: An Empirical Study in Third-Level Chemistry and Physics Students	Salica, Marcelo Augusto	2019	Salica Marcelo highlights that the manner college students accumulate and manner records is a key aspect for effectively integrating Information and Communication Technologies (ICT) into the	10.24215/18509959.24.e08

				curriculum in technological know-how classes: Physics and Chemistry.	
15	Learning Histology Through Game-Based Learning Supported by Mobile Technology	Rojas-Mancilla, Edgardo Conci, Daniel Bernal, Yanara A Astudillo, Dan Contreras, Yuri	2019	This paintings has proven that mastering primarily based totally on virtual technology and the trying out impact are powerful in enhancing mastering. The use of records and verbal exchange technology gives the possibility to check progressive mastering techniques withinside the classroom.	903-907, 2019

**Source:** Own elaboration.

## 4. DISCUSSION

Once the matrix assessment of the distinct methods offered in preceding reviews is completed, it's miles obtrusive that the affect of statistics and verbal exchange technologies (ICT) inside the context of customized getting to know for college college students has been a non-stop evolutionary process. In the past, previous coaching techniques brought about a bad pleasant of training and getting to know (Roys Romero, 2019).

The maximum brilliant case centered at the engineering field, wherein it changed into discovered that college students, upon getting into college for the primary time, exhibited a sturdy hobby in getting to know. However, because the years of look at progressed, their hobby and staying power reduced because of out-of-date coaching and getting to know techniques. Not simplest engineering college students, however others as well, observed that extended publicity to previous coaching methodologies and tools, which did now no longer align with their cutting-edge personalities, brought about shifts of their dreams toward simply staying sane, keeping self-esteem, and warding off failure (Moreno et al., 2019).

This truth is supported via way of means of Ocaña-Fernández et al. (2019), who argued that the pupil body, at the side of the statistics age, demanded a large paradigm shift, changing inflexible requirements with extra possible ones. To enhance this situation, the mixing of ICT for customized getting to know changed into proposed as the important thing to enhancing or absolutely converting the cutting-edge scenario.

In their literary works, Salas Rueda (2019) and Ocaña-Fernández et al. (2019) asserted that incorporating ICT could result in a giant development in customized getting to know. Authors together with Cunha & Hernández Vélez (2019), Villena Muñoz & Rivas Maldonado (2019), Rios Miranda & Portugal Durán (2019), and Baracaldo Guzmán (2019) discovered all through their research that college students confirmed brilliant development in academically difficult areas.

Not best did topics like calculus, physics, chemistry, English, and algebra advantage extra popularity amongst college students, however even records have become greater attractive while customized gear had been evolved to carry new knowledge. Rojas-Mancilla et al. (2019) recommended that one customized method can be using 21st-century tutors, an concept supported through Galán Mireles & Moreno Tapia (2019), who showed that modern-day tutors will be the pleasant choice to make sure college students do now no longer sense misunderstood while discussing technological gear.

Despite the advantages offered in preceding studies, there has been additionally competition concerning the utility of a cognitive assessment version to the customised gaining knowledge of acquired through automation college students, who had been taught the usage of technological gear. In his observe, Salica

(2019) stated that after an assessment version changed into carried out to college students who had acquired customized training thru ICT, it have become clean that the velocity with which questions had been responded recommended blatant and shameless cheating (Pratto Burgos, 2019).

Benítez González (2019) stocks Pratto's perspective, as his observe additionally highlighted that, regardless of the tremendous have an effect on of ICT withinside the better training context, troubles of plagiarism and irrelevant acquisition of outside educational content material ought to arise.

The out of control implementation of ICT ought to cause violations of college students' non-public ethics, because it opens the door to the usage of records without the earlier consent of authors (Bedregal et al., 2019).Meanwhile, Gómez Vera (2019), in his work "The Challenge of New Technologies," emphasised that the have an effect on of ICT on customized gaining knowledge of calls for an affordable model period, which now no longer all college students manipulate to complete (Calle-Álvarez & Agudelo-Correa, 2019).

Even alevn though ICT's are offered as gear that prefer the gaining knowledge of all college students, Bedregal et al. (2019) talked about that now no longer all college students have the sources to have interaction withinside the instructional environment, as get entry to nice records regularly comes at an excessive cost.

They additionally argued that regardless of the autonomy and customized gaining knowledge of supplied through ICT, the function of the trainer can't be overlooked (Molinero & Chavez Morales, 2019). This view changed into corroborated through Kraus et al. (2019), who emphasised that the have an effect on of ICT on customized gaining knowledge of additionally pushes instructors to be 21st-century educators. Since they proportion the equal genesis as Generation Z, they might have extra alternatives for personalizing gaining knowledge of. Nández-Rodríguez et al. (2019) additionally agreed with Molinero and Kraus, noting that ICT in college gaining knowledge of calls for instructors to study from the start in laptop skills, which includes the funding of extensive sources inclusive of time.

While Kraus, Molinero, and Nández defended the concept that the effect of ICT at the personalization of college mastering needs coaching and dedication from each instructor and college students, Aycart Carrasco (2019) argued that there may be no complete manual to facilitate the coaching of instructors and, in turn, of college students who, now no longer being a part of Generation Z, conflict to conform to training in a globalized context. Rodríguez Morales (2019) additionally shared this view, suggesting that the shortage of guiding methodologies and fundamental equipment that remember the ones now no longer a part of Generation Z might have a poor effect at the community, turning the effect of ICT into something darkish and bleak.

Despite the poor aspects, the effect of ICT at the personalization of college students' mastering is considered undoubtedly with the aid of using mother and father. Angulo Armenta et al. (2019) referenced the amazed response of mother and father whose kids are pursuing college degrees, expressing that they're greater happy with the complete training their kids receive, as they themselves confronted extra instructional demanding situations of their time.

## 5. CONCLUSIONS

This After engaging in the analysis, it's far concluded that ICT's permit college students to get right of entry to a significant array of instructional resources, from e-books to on line studying systems and academic videos. This helps customized studying, as college students can select substances that pleasant fit their studying patterns and unique needs. E-studying systems and online guides permit college students to development at their very own pace, reviewing and revisiting substances as needed. This is specifically useful for folks who may also require extra time to comprehend positive standards or for folks who want to strengthen extra fast of their studies.

ICTs additionally provide interactive gear along with simulations, instructional games, and online assessments, which now no longer handiest make studying extra enticing however additionally offer instantaneously remarks. This remark permits college students to fast become aware of their regions for development and alter their observe techniques accordingly. The integration of ICTs into college studying helps get right of entry to schooling from everywhere at any time, breaking down geographical and temporal barriers. This is vital for college students who've paintings or private obligations that make attending in-character training challenging.

Another noteworthy thing is that on line conversation gear, along with forums, chats, and video conferences, foster collaboration among college students and professors, in addition to many of the college students themselves. This collaborative surroundings permits for a extra dynamic change of thoughts and the improvement of teamwork and conversation skills. ICTs permit for the introduction of content material in more than one formats (text, audio, video, interactive), making it simpler to cater to exclusive studying patterns (visual, auditory, kinesthetic, etc.). This variety in imparting data guarantees that every scholar can research withinside the handiest manner for them.

ICT-primarily based totally gaining knowledge of structures gather facts on scholar overall performance and behavior. This facts evaluation permits educators to customise content material and sports in step with every scholar's strength and weakness, for that reason enhancing the performance of the academic process.

The use of ICTs withinside the academic context additionally contributes to the improvement of virtual skills in college students, a vital ability in brand new world. Familiarity with technological gear and virtual gaining knowledge of structures prepares college students for the current painting environment. The incorporation of ICTs in college schooling fosters innovation in coaching methodologies, permitting educators to test with new approaches of turning in knowledge, together with project-primarily based totally gaining knowledge of, gamification, and augmented reality, thereby enriching the academic experience.

The have an effect on of ICTs on customized gaining knowledge of withinside the college context is profound and multifaceted. By presenting gear and assets that adapt to the man or woman wishes of college students, ICTs now no longer most effective decorate the fine of gaining knowledge of however additionally sell greater inclusive and available schooling. However, it's far critical that academic establishments and educators live up to date with technological advances and undertake pedagogical techniques that maximize the capacity of those gear for the gain of all college students.

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