Informatization of Society through Education- A Perspective Study

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Area/Section: Management
Type of the Paper: Regular Paper
Type of Review: Peer Reviewed as per |C|O|P|E| guidance.
Indexed in: OpenAIRE.
DOI: https://doi.org/10.5281/zenodo.15400981
Google Scholar Citation: IJMTS

How to Cite this Paper:
Kamath, M.(2025).Informatization of Society through Education- A Perspective Study. *International Journal of Management, Technology, and Social Sciences (IJMTS), 10*(1), 218-229. DOI**:** https://doi.org/10.5281/zenodo.15400981

International Journal of Management, Technology, and Social Sciences (IJMTS)
A Refereed International Journal of Srinivas University, India.

CrossRef DOI: https://doi.org/10.47992/IJMTS.2581.6012.0383

Received on: 19/03/2025
Published on: 14/05/2025

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ABSTRACT

Purpose: *The purpose of this research paper is to show how the Informatization of society can be achieved through use of ICT tools in Education*
Methodology: *It also uses secondary data from well-known journals, books, conference proceedings, and reports.*
Findings: *The very application of the latest Information and Communication Technology (ICT) tools has achieved great results in achieving skill competencies particularly cognitive skills in every field. This has encouraged most people or the teaching community in particular to share, clarify and improve the content using ICT which led us to the Informatization of Education which is a continuous process to change or reform the Education system. This Informatization of Education by Educators has a profound impact on society and leads to the Informatization of Society ultimately leading to an Information Society. Information society is preliminary step in building smart society through smart devices/Technologies.*
Implication/Limitation: *Research study is fully based on existing data from websites, literature articles comprising journal papers, conference proceedings and reports from well-known organizations. Primary data collection has not been carried out for self-analysis which is a void in any research study.*
Originality/value: *It is recommended that to achieve positive results in students or learners, Educators need to apply ICT tools(software/device/platforms) for Informatization of Education for Informatization of Society to transform into an Information society.*
Limitations: *The paper analyses secondary data from online resources like e-books, journal papers and conference proceedings.*
Paper type: *Perspective Study paper.*

Keywords: Informatization of Education, Information and Communication Technologies, Informatization of Society, Information Society.

1. INTRODUCTION :

The informatization of Education mainly includes new pedagogical methods, developing learning materials, training future teachers, and informatizing data management (Xiaona, M., 2021). [1]. Informatization is a fundamental term for building the Information Society (Romansky, R., 2021). [2]. Extensive use of ICT infrastructure to become an information society is called the Informatization process (Chan, C. M. et al., 2005) [3]. The concept of smart cities is also termed by some as Information cities or Connected cities or Ubiquitous cities necessitates its inhabitants to be information-rich for that reason there is a huge demand for information in all the spaces be it the digital or physical world (Ismagilova, E. et al., 2019). [4]. The informatization of education, which changes the environment of education, methods, specialist models, and socialization of personality can be got by adopting the latest Information and Communication Technology (ICT) (Anatol'Evna, S. N. et al., 2021). [5].

Informatization of education increases the development of skills of self-education/self-realization and increases the quality of education by advancing the potential of each person through Research and development of new scientific and technological advancements thereby creating an informative society thus contributing to the intellectual development of a nation (Fedorenko, E. H., Velychko, V. Y., Stopkin, A. V., & Chorna, A. V., 2019). [6]. Opportunities of informatization of education allowed the development of remote forms of organization of the educational process like e-learning, virtual laboratories, internship courses(certification), and workshops/seminars(online) have become widespread in a pandemic era. Life skills like morality and independence can be given more priority which helps

society in the longer run. Information Society provides data to form national information resources necessary for the socio-economic progress of society (Kondur, Oksana & N, Fuchynska., 2021). [7]

2. RELATED WORKS :

Google search is a search engine used to search the literature available on the internet domain. Google scholar is the repository or Database of journal papers, and research materials like books and articles. **Table 1** below gives an account of the literature available in the internet domain published between 2018 and 2022 with the keywords Informatization, Education, ICT, Informatization of Society, Information Society 5.0, and Informatization of Education which are related to the title of the paper.

Table 1: Related literature on Informatization of Education, Information Society, ICT, Mobile learning for individualization, and Informatization on the job Market.

S.No	Keyword	Methodology	Contribution	Reference
1.	Informatization of society	Data collection from teachers is analyzed and results are tabulated.	The paper strongly supports ICT particularly multimedia-based education for student engagement and involvement in all spheres of learning.	(Kuchai, O. et al., 2022). [8]
2.	Informatization of Education	This journal paper is aimed to establish information on Education as a process, an area of pedagogical science for integrating knowledge in science and pedagogy.	This paper shows the true power of ICT in Education for immediate feedback, ease of transfer/sharing information, and access to simple information resources around the world.	(GOROKHOVA, N. V., 2018). [9]
3.	Information society 5.0	Summary from secondary data collected from various literature sources are used for the preparation of the paper.	The paper envisions future society (information society 5.0) to be critical thinking, problem-solving, service-oriented development, and negotiations without conflict and arguments.	(Apdillah, D. et al., 2022). [10]

4.	Robots for informatization in education	Experiment study on robot usage willingness before robot construction task and after robot construction task.	The experiment & survey suggested good support among the learners to use robots in learning after the experiment.	(Tsarapkina, J. M. et al., 2019). [11]
5.	ICT	The data from leading economic reports and other government sources were analyzed in paper and many tests done.	Granger causality test results show the presence of a relationship between electricity consumption, internet usage, economic growth, environment protection measures which ultimately points towards economic indicators.	(Haseeb, A. et al., 2019). [12]
6.	Mobile learning for individualization	The paper is strongly supporting mobile learning through data from existing literature works.	The paper suggests m-learning for individualization of tasks or activities and learning through the cognitive domain which basically leads to informatization of Education as m-learning is also part of it.	(Tangirov, K. E. et al., 2020). [13]
7.	Creativity with Informatization of Education	Paper shows with experiments how ICT can be used in science or non-science subject learning can be enabled with emphasis on incorporating new models(ICT model and non-ICT).	Paper deals how effectively ICT can be used in boosting student creativity using different learning modes like seminars, laboratory experiments and lectures in university courses.	(Ramankulov, S. et al., 2016). [14]
8.	Informatization of Higher education	The paper reviews the existing ICT infrastructure of the Higher education sector in the country.	The paper extensively gives out an explanation of the telecommunication network in Kazakhstan and how it has helped the education sector and still many challenges	Sapargaliyev, D. et al. (2013). [15]

			exist for complete transformation.	
9.	Informatization of Education	The paper conducts experiments on Vocational Education Training institutions' acceptance and application of ICT in education for student competence in professional skills.	The paper stresses on ICT application at every level of education from school to Higher Education for a complete turnaround.	(Lytvyn, A. et al., 2020). [16]
10.	Informatization	The research paper reviews existing work and conducts data analysis from government data or source.	The research paper lists out different direct and indirect consequences: positive and negative both on informatization of Ukraine country through internet and services by service rendering portals operating in Ukraine.	(Danyliuk, M. et al., 2021). [17]
11.	Informatization on job market.	Paper uses data from World Economic Report (2020) and secondary data from other papers to come to a conclusion.	Most of the jobs such as manual entry of data in government offices or private enterprises started a negative increase trend across sectors so the world economic report suggests that in coming years more and more jobs are going to be lost to computer applications or robots which pits man versus machine against each other and only higher end jobs would remain.	(Yashchyk, O. et al., 2021). [18]

3. RESEARCH GAPS :

After an extensive research study researcher found out following research gaps in the above papers

i. It is not very clear that the Informatization of Education first Step for smart (completely Digital) Education thus creating smart cities powered by information-rich people.
ii. How Smart cities need all levels (primary, high school, and pre-university and University Education) of Smart Education.
iii. How a smart economy can be built using knowledge of Higher Education expertise.

4. OBJECTIVES :

The research study aims

1) To show how informatization of Education is one of the ways to informatize the Society or help in the creation of an Information society.
2) SWOC Analysis of the informatization of Education for the Informatization of society.

5. METHODOLOGY :

This study relies on the use of online data mined from Google Scholar databases and Google search engines. The study relies on an in-depth analysis of the literature available online and has relied on extensive citations of the same by the researcher.

6. SWOC ANALYSIS :

Google Search is the search engine used for SWOC findings and tabulated in format to produce the SWOC analysis below. The Strength, Weakness, Opportunities, and Challenges of Informatization of Education is given in **Table 3** below.

Table 3: Strengths, Weakness, Opportunities and Challenges of the Informatization of Education.

Strengths	**Weakness**
i. Informatization of Education has become an important index to measure the modernization, comprehensive national strength of a country and social development (Wei, C. et al., 2021). [23]. i. Information and communication culture dynamic in higher education is found through research, and deeper components like the content-target, cognitive, emotional, motivational and communicative analysis (Fortova, L. K. et al., 2019). [24]. i. E-learning and online educational services are prerequisite for the digital economy's prosperity since they boost the productivity and management abilities of educational institutions (Dneprovskaya, N. V. et al., 2018). [25].	i. Web survey software products are having issues with sampling frames, response rates, dependence on bandwidth, participant deception, and access to populations (Wright, K. B., 2005). [26]. i. Chaotic distorted information and received knowledge affect processes of socialization often leading to distorted understanding of the reality from virtual media effect which is acute in higher education (Fortova, L. K. et al., 2019). [24]. i. Relying too much on multimedia or networks or the internet results in a communication blank(gap) between teachers and students as teachers are busier in searching in the Google domain than what is happening to their students and vice versa (Wu, S. et al., 2013). [27].
Opportunities	**Challenges**
i. Animated objects, multimedia displays, and audible information in virtual travel provide the learner with extra visual engagement (Atamuratov, R. K., 2020). [30]. i. The use of multimedia technologies; automated control, assessment, and a crores of learning materials that can be shared through the education management system are the advantages of ICT usage or Informatization of Education (Pet'ko, L. et al., 2021). [31].	i. The tasks in AR environments may require students to apply and synthesize complex skills in spatial navigation, teamwork, solution-seeking, technology innovation, and mathematical evaluation (Wu, H. K. et al., 2013). [28]. i. In some AR systems, the teaching order is inflexible; teachers are not able to make changes to course contents to incorporate learning objectives (Wu, H. K. et al., 2013) [28]. i. The lack of funding, low connectivity rates, lack of software tools/devices, lack of skilled personnel, and material development available in the educational institution are some of the most important challenges for informatization of Education or (ICT) technology adoption in colleges (Ilic, P., 2021). [29].

7. FINDINGS :

Google Search is the search engine used extensively for carrying out the research. Optimization, individualization, differentiation, intensification of education and improvement can be brought about by Information technology Integration in the educational process (Makarenko, L. et al., 2015). [19]. There are 2 different pedagogical methods in teaching especially in higher education. First being traditional approach is popularized by fundamental ways like lectures, practical exercises, laboratory exercises, course work, thesis, and teaching practice are traditional learning methods. Second is characterized by innovativeness or novelty approaches such as problem-based learning, concentrated learning, and modular learning. Many researchers believe that for modernizing education we require a good combination of both approaches as future teachers and learners require problem-solving self-learning coupled with interactive and command-receiving (in other words teamwork) abilities too (Qizi, S. Z. M., 2021). [20]. The rapid improvement and spread of cloud technologies (cloud computing) are increasingly contributing to the growth of the IT industry, but also in business, finance, government, medicine, education and many other areas of human life. The components of the Information education environment are divided into two entities. The first component is the subject that is actors in the system (teachers and students for learning) and the Second component objects that comprise activity tools, methods, material base, pedagogical process management and communication methods are the Objects (KARINTSEVA, I. et al., 2020). [21]. The ecosystem of the innovation entrepreneurship or startup university should have a startup factory, Workshops for the generation of ideas, a Venture Fund, Innovative R&D laboratories, seminars where you can present your project progress, Coworking spaces, Design centres labs that would foster the development of startups in the campus itself so that student with a startup business model can expand once he goes out of academic boundaries (Kraus, K. et al., 2021). [22].

Table 2: Findings for Informatization of Society through Education.

S.No	Keyword(s)	What is already there in Research papers (Secondary data)	What can be applied to my paper (Results)
	Informatization of Society through Education.	i. Informatization of society is defined as the accumulation, processing, storage, transmission and use of information through social activities (Kuchai, O. et al., 2022). [32]. i. Development of the Innovative character of the realized educational technologies and the partnership of educational institutions with the research and industrial organizations for Smarter Education (Knyaginin, V. N. et al., 2016). [33]. i. A data-driven Society 5.0 that attempts to see the problem in a much wider concept and solves the problem in a humane way using advanced tools and Society 5.0 is also called super smart because it considers the solution not in isolation (Deguchi, A. et al., 2020). [34]. v. The challenges for AI	Informatization of Society can be developed by constant efforts from various sectors or stakeholders in governance or service or Industry people working for societal benefit. Informatization is boosted by digital initiatives in different sectors like Education, Health, services, Industry(manufacturing), and other nation building sectors like defence, Trade. Education (Training) is a common link which can connect these isolated sectors to boost the performance of these sectors by providing solutions by experts available in the universities. Society 5.0

		adoption in Education: a balanced government policy supporting inclusion and equity in AI in education, Preparing AI and teachers to understand each other, Developing quality and inclusive data systems, conducting research on AI in education, transparency in data collection, use and dissemination (Pedro, F. et al., 2019). [35]. v. Pedagogical methods are reforming towards innovation in their learning processes to transform into a technological society (Miranda, J. et al., 2021). [36]. i. IES or intelligent Education System which has Technology (Network, device and software), Data (Collection, Analysis and Storage), Management (Security, Control and Quality), Smartness (Decision Making, Personalization, Flexibility), End User(Students, Teachers and Authorities) components for Smart Education which is for Smart society for Smart world in Future (Terzieva, V. et al., 2021). [37]. i. Smart education fostered by cloud + social media + Big data analytics for advanced research learning for a smart society paving the way for a smart economy (Dneprovskaya, N. V. et al., 2018). [38]. i. Smart Economy (Economy 5.0) has a positive effect on ease of living but has negative effects on employment (Sułkowski, Ł. et al., 2021). [39].	is super smart society where every data is available to policy designers and implementers for effective actions for permanent solutions. Society 4.0 is manufacturing society that needs quality data for providing quality products to consumers that data can be produced by individuals in society 5.0 recorded in different systems in government IT infrastructure. Smart Education through smart technologies like AI, Ubiquitous computing and Cloud Computing can help reduce the wastage of resources like human and monetary for the effective implementation of project works. Smart Society or Society 5.0 can be achieved by adopting smart technologies in every field of society particularly in Education for the people-centric decisions from the government. Information-based society is a small step in a smart society direction.

8. SUGGESTION AND LIMITATION :

The researcher suggests that future researchers be non-biased and open to different perspectives on Education and ICT technologies as ICT implementation can be sometimes counterproductive meaning having a negative impact on the overuse of it. Limitations of this study are that it only visualizes the importance of ICT in Education or Informatization of Education without primary data. Researcher has extended secondary data to conclude on the future impact of Informatization of Education which is smart solutions for Smart society or smart cities.

9. CONCLUSION :

After the research study or investigation, it has been found that the future is complete computerization hence it would touch the Education field also. Applying ICT to the Education process is completely changing the way learners consume information from different sources like the web, educators and other people with whom the learner meets or interacts. Informatization or information-based Education leading to skills development for 21st Century labour force. ICT tools used for Informatization can be as simple as Google Scholar or Google Search or as complex as a robot machine. The educator has an important role to play in an Information-based society where citizens can access their all services from the Government through electronic means. Smart Education through Informatization of Education by using different Smart ICT technologies can make Education effective and efficient as Monitoring the progress of learners is possible Assessment is non-biased and quality is ensured. Smart Society or Society 5.0 can be achieved by adopting smart technologies in every field of society particularly in Education for the people-centric decisions from the government. Information-based society is a small step in a smart society direction. Smart Economy or Economy 5.0 can be achieved only if all sectors like Education, Manufacturing, Services and Government Executives work collaboratively using Big Data from all local government agencies collected without corruption and malpractice put to use in good sense. A Smart Economy requires smart Decisions on Smart Data from these sources analyzed using Smart Technologies. Smart Education can act as a binding force between these agencies or institutions for well-cohesive unit work. The results of Smart Education would be research society for solving citizens problem in a cost-effective and efficient way.

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