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## “Application of ICT in Enhancing the Intelligence and Creativity of Students”

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### Abstract:

*The integration of Information and Communication Technology (ICT) in education is increasingly recognized as a powerful tool for enhancing learning experiences. However, the adoption of ICT tools in the education of middle school students, particularly in North India, faces several significant barriers. This paper explores how ICT can open the doors of opportunities for children in improving their intelligence and carve their creative potentials, the challenges, including inadequate infrastructure, insufficient training for teachers, economic disparities, and a lack of localized digital content. Rural areas, in particular, struggle with limited access to reliable electricity and internet connectivity, which severely hinders the use of ICT in classrooms. Additionally, the economic divide results in unequal access to devices like laptops and tablets, leaving many students unable to benefit from digital learning. Teacher resistance, stemming from limited technical proficiency and a lack of professional development opportunities, further exacerbates these challenges. Cultural attitudes towards traditional forms of teaching, combined with the complexity of aligning ICT tools with the curriculum, also slow down adoption.*

*The implications of these barriers are far-reaching, affecting student engagement, the quality of education, and the potential for fostering critical thinking and digital literacy skills. This study underscores the need for targeted policies and initiatives to overcome these barriers and highlights the importance of regional cooperation in enhancing ICT integration in middle school education across North India. Addressing these issues is crucial for ensuring that all students, regardless of geographical or socio-economic background, have access to quality digital education, which is essential for their development in the 21st century.*

**Introduction** - The integration of Information and Communication Technology (ICT) tools in education has become a cornerstone of modern pedagogy, offering dynamic learning environments that enhance student engagement, foster creativity, and promote personalized learning. In middle school education, where foundational skills are developed, the use of ICT is critical to prepare students for the

digital age. However, in many regions, including North India, the application of ICT tools faces several obstacles that hinder its effective implementation.

The objective of this study is to examine the barriers preventing the successful integration of ICT tools in middle school education in North India and to assess their implications on the overall learning process. By identifying these barriers, the study aims to provide insights that can help educators, policymakers, and stakeholders address the gaps and facilitate a more inclusive digital learning environment.

The significance of this study lies in its focus on middle school education, a crucial period where students are expected to develop critical thinking, problem-solving skills, and digital literacy. ICT tools can greatly enhance these capabilities, but only if they are effectively integrated into the learning process. The findings of this research could inform policy reforms, drive initiatives aimed at improving ICT infrastructure, and provide direction for teacher training programs, thereby contributing to the advancement of digital education in the region.

The motivation for this study stems from the growing digital divide witnessed across different regions of India, particularly in rural and economically disadvantaged areas of North India. While urban schools may have better access to ICT tools, a significant proportion of the population remains underserved due to infrastructural and socio-economic challenges. Understanding the root causes of this disparity is essential to ensure equitable access to quality education for all students, regardless of their location or financial background.

However, this study faces several challenges\*\*, such as the complexity of ICT integration in rural settings, limited availability of data on ICT usage in middle schools, and the difficulty of measuring the impact of ICT barriers on student learning outcomes. Additionally, the resistance to change in teaching practices and a lack of awareness regarding the potential of ICT tools further complicate the scenario. Despite these challenges, the study aims to offer practical recommendations for overcoming the barriers to ICT adoption and improving the educational experience for middle school students across North India.

Information and communication technology (ICT) can play a role in students' intelligence in many ways, including :

#### **Augmented concentration abilities -**

Students can concentrate better on digital and interactive tools, which can help them learn concepts more quickly. ICT tools help the students to focus on their tasks and targets, which further adds on to their abilities to think analytically. Without ICT tools, students can get engaged in irrelevant sources of information which may be misleading, whereas by using ICT tool, it becomes easier for them to set their needs, plan effectively and execute them. Proper implementation of plan of action and deliverance of required results helps them to develop their concentration abilities.

#### **Enhanced critical thinking -**

ICT provides students with a variety of information sources, which can expose them to new points of view. Students get a new diaspora of thoughts, ideas and new sources of solutions to problems, thus

helping them to develop the ability of critical thinking in them. New realms of thought process enlightens the learners in many ways and they become able to think what was practically impossible for them without ICT tools. Exploring new questions and finding their answers awakens them and makes them effective Critical Thinkers.

### **Improved Communication -**

ICT can help students communicate with teachers and other students, and can help streamline the process of sharing ideas. Sources of information come in many forms for students by the help of ICT tools. Whatever the findings are, can be easily shared and spread amongst others so that a seamless availability of information and learnings becomes possible.

### **Productive Synergy -**

ICT can help students collaborate with each other students and with teachers, and can help them work together to solve problems. Learners easily become used to team work and improve on their social behavior, acceptability and leadership qualities. Being a part of the society, a person cannot excel alone on his or her own. Team work always increases the effectiveness and efficiency of all types of tasks. Thus, ICT tools help a great deal in making great teams and better results. Students and learners gel up properly with the surroundings and people around them contributing in a better society.

### **Comprehensive and Competency- Based Progression -**

ICT can provide educators with real-time data on student learning progress, which can help them provide immediate feedback and adjust their teaching strategies. This also assists in developing the IQ of learners, because all learning process is in vain if proper evaluation is not done. ICT tools help in identifying the areas of interests of learners and can be used to act as a guide or frame counselling tools for the students, so that optimisation can be achieved in developing the learning abilities.

### **Learning Environment Flexibility -**

ICT can increase the flexibility of education delivery, allowing students to access knowledge from anywhere and at any time. The use of ICT tools gives the freedom to the learners and they don't have to face the time boundations as in formal education schedules. The access of ICT tools to the students allows them to pursue their studies and investigations at any time and at any place. Many times, the hesitations and barriers the students face in formal education schedules are totally avoidable when they have the access to ICT tools.

### **Enriched learning experience -**

ICT can help students learn together from different parts of the world, using both online and offline resources. The use of ICT tools expands the learning boundaries, provides innumerable and authentic resources of data and information, the ideas and researches of various scholars, learners and experts of different fields. There is a lot of possibility that the students/learners may not have access to all

the aspects of the subject matter in their class room with the interaction with their teachers or educators, or amongst themselves. The use of ICT tools adds on to the available facilities of offline learning. Anything that can be learnt in the classroom or offline mode, can be further enriched by the use of ICT tools by the learners.

### **Professional development -**

ICT can help with the professional development of teachers and others involved in teacher education. The use of ICT tools has actually brought a revolution in teacher education. ICT tools have brought new realms in the process of learning and making new educators. These tools have professionalized the systems of bringing new and effective ways of making able and competent professionals in the field of teaching. Rather, the learners have also benefitted from these tools in many ways as discussed above, and are eventually becoming a part of the competent and professional teaching learning system.

Information and Communication Technology (ICT) can help students develop their creativity in a number of ways, including :

**Collaboration and Participation:** ICT can help students work together on projects, which can help them develop teamwork skills. Working in a team instills creative factors in an individual, and while using ICT tools, the creativity of individuals is fortified in many ways.

**Independent learning:** ICT can give students more opportunities to be independent and innovative. Being independent and innovative opens the doors of newer opportunities and tasks for learners which helps them to think creatively and achieve their targets.

**Personalized learning:** ICT can help develop individual learning skills and enhance creativity.

**Digital skills:** ICT is an important part of learning in the digital age, and students need to be able to use digital tools.

**Creative thinking:** ICT can help students grow ideas, make connections, and create with technology tools.

**Early childhood education:** ICT can help preschoolers develop a positive attitude towards ICT and increase their creativity.

### **Advantages of ICT in Education -**

New technological tools not only bring innovation to academic centres, but also speed up the transfer of information, increase student interest, and allow processes to be automated, among other aspects to be taken into account.

It improves concentration and comprehension. The activities carried out through digital and interactive tools increase student concentration and, therefore, they assimilate concepts more quickly, enhancing learning. This type of tool involves students in more practical learning, with the aim of reinforcing what they have learnt.

It promotes student flexibility and autonomy. New technologies promote autonomous learning for students. With the incorporation of digital alternatives such as online courses, each student can learn at their own pace, optimising time and resources thanks to the flexibility provided by digitalisation and connectivity.

It encourages critical thinking. The diverse sources of information that technologies provide bring new points of view to students. In this way, information and communication technologies encourage debate and the acceptance of other people's opinions. In addition, the exchange of thoughts allows students to learn about different cultures.

It facilitates communication between teachers and students. The whole educational community has quick access to the same resources. In this way, digital tools allow direct and immediate interaction, without the need to be physically present. This was especially important during the confinement experienced during the 2020 health crisis.

Increased classroom productivity and collaborative work. New technologies in the classroom, specifically those that allow access to online content, improve learning productivity by optimising instruction time, and thanks to connectivity, it feeds collaborative work, thanks to new teaching formulas.

It stimulates motivation. The incorporation of technologies in the classroom improves the motivation of students, it is a quick and practical technique to stimulate the study of new concepts. Digital tools are the daily communicative support of the new generations, therefore, they are easily handled in this environment.

It incorporates new learning methods. Another of the advantages of ICT in education is that teaching professionals can incorporate new teaching methodologies, thus improving academic results and encouraging dynamism in the classroom. Moreover, their use implies the development of the digital skills needed to avoid the digital divide.

### Disadvantages of ICT in education -

Technologies are not perfect; **just as they bring many benefits to education**, they also have some disadvantages to be taken into account.

Distractions and lack of attention. Digitalisation means opening up unlimited access to multiple resources and sources of information, such as web pages, social networks or chats, and therefore, they take attention away from the subject matter.

Excessive impact. Excessive and inappropriate use can lead students to a compulsive relationship with technology, which can lead to an inability to control consumption and, consequently, have adverse effects on the student's health, social, family and academic life.

It reduces the development of other skills. Practices such as writing, public speaking and reasoning may be nullified by the widespread adoption of digitisation in academic institutions. This has been demonstrated in a recent study conducted by the University of California. The report details that the social skills of the new generations are based on the digital environment, therefore, direct personal communication can be affected.

Consumption of false information. Much of the information available on the internet is false or incomplete. This fact has a direct influence on the media literacy of students, especially in the ESO educational stage, since half of them do not know how to detect false news, according to a study by the Carlos III University of Madrid.

Theft of personal data. A lack of knowledge about the dangers of cybercrime can unintentionally expose pupils' data, especially if they are minors, for example, by sharing photos with strangers.

It reduces human contact. With the incorporation of new technologies, the learning process becomes more distant and the physical relationship with teachers and classmates decreases. As a consequence, by reducing human contact, isolation can appear and become an obstacle to students' personal development.

It amplifies bullying. A complex subject to deal with and one of the biggest risks is bullying. The lack of physical contact can lead to a loss of assertiveness and misuse of online tools and platforms, which can lead to digital bullying situations.

## SUGGESTION THAT HELPS TO OVERCOME SCHOOL CHALLENGES REGARDING ICT

In most countries throughout Europe, the need for technology has grown in importance over the last 10 years or so and has made breakthrough changes to the way schools are run. While many have achieved huge progress through their use of technology, others still have a long way to go. Here are eight ways improved ICT support can benefit schools:

### **Managing administration -**

With the correct ICT systems and support, teachers can save time by easily accessing school and student data whenever needed, rather than searching for information across spreadsheets. Many school platforms provide information such as targets, predictive analysis and online assessment, which should help teachers with reporting.

According to a recent survey carried out by the National Education Union, 80% of teachers considered leaving the profession within the last 12 months due to an intense workload; while a poll taken by Teacher Tapp discovered that only an alarming 50% of those who currently teach believe they will still remain in the profession in 10 years' time. The development of online learning facilities can support teachers in reducing workload and could help with teacher retention.

### **Greater efficiency**

With the right technology in place, schools can notice huge changes in efficiency with both teachers and students managing workloads more easily. Teachers can make better use of their time completing tasks online and instead spend more time on one-to-one teaching or giving feedback on work for improvement. Likewise, students can get easy access to teachers' notes, upload homework, or discuss tasks with peers instantly.

#### **1. Security and safeguarding**

ICT support should protect children, data and school systems. For example, a cloud platform means that instead of using USB sticks to manually upload/download homework tasks, information can be more safely stored and protected online. A full review from a professional team may be necessary at least once each year to ensure confidential data is safe. Firewalls and anti-virus software should be used to prevent hacking, phishing and malware activity; while online filtering can be applied to ensure searched websites are age appropriate, education related and time based (for example, allowing Skype to be unblocked in the evenings, should boarding students wish to contact relatives).

#### **2. Better student behaviour and learning**

If the correct programs and applications are chosen, ICT can inspire engagement throughout lessons. It can also be beneficial for SEND students who might struggle to keep up. Students work differently, but tech platforms allow those with learning difficulties to complete tasks at a comfortable pace, while others can skip ahead if need be. Students who are more engaged in the lesson are also far more likely to remember what they have learnt and participate in class discussion. Your ICT provider could suggest the most effective options.

### 3. **Improving parent communication**

Keeping parents in the loop with all the latest news and updates can often be a challenge. However, making sure they are well informed is an excellent way of maintaining a positive relationship between the school, staff members and parents. Online platforms give parents the opportunity to check on pupil progress, while personalised messages can be sent out to parents, either individually or in bulk.

### 4. **Improving communication across the schools**

We believe that cloud collaboration is being used in around just one third of schools currently. The lack of virtual sharing can often present challenges in schools – especially those which are part of a trust or cluster, where daily collaboration is needed. Managing physical documents can become a burden for staff members, however, a cloud system means documents and data can be shared effortlessly, which should improve school communication and increase efficiency.

### 5. **Improving day-to-day work for office staff**

Office staff rely on computers to get their work done, so making sure they have the right tools for the job is important. This might be in the form of enhanced software or a more advanced computer to complete tasks quickly and efficiently. Schools often ask us to review their office ICT so why not [request a free health check?](#)

### 6. **Getting better results**

91% of leaders in schools believe that pressure has increased significantly over the last two years; however, ICT can considerably enhance overall school performance and attainment. For example, according to Becta's [‘A review of the research literature relating to ICT and attainment’](#) ICT can have a positive effect on pupils’ learning of different concepts and skills in mathematics (alongside other subjects) at both primary and secondary levels.



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