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The Roles of Information and Communication Technology (ICT) in Transforming Students Learning Outcomes at STMIK DCI Tasikmalaya

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ABSTRACT

This study aimed to gain an in-depth understanding of the teaching system at STMIK DCI Tasikmalaya, especially the role of information and communication technology in transforming student learning outcomes. The data sources consist of three sources: interviews with academics, documentation, and field observations. After getting the data, the researchers tried to analyze using phenomenological approach, namely trying to understand from a series of existing data such as coding the data, evaluating the data, and reporting as data as well as interview data that report in text form. Based on the results, the researchers concluded that the students in using ICT could transform the student learning outcomes, for instance have a good skills in computers. They had also used it to solve the problemhe problems in class and they had planned for the benefit of supporting career tools in the future. The adoption of technology could provide convenience for students for lecturers in finding data, processing data, and synthesizing and communicating data in learning. Likewise, transforming technology was not only learning outcomes but also its ability to assist academics in evaluating student learning outcomes to make the parties work optimally.

Keywords: *Students Learning Outcome, Communication Technology, Information Technology*

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INTRODUCTION

The emergence of information and communication technology (ICT) in various business and education sectors is a critical issue to be studied(Majumdar, 2015; Putra & Aslan, 2020; Putra, Mizani, et al., 2020; Putra, Liriwati, et al., 2020). Therefore, the parties in the world of education and technology business continue to study and question the role of these technological tools in supporting students learning from school to university levels. This happens because they see that the presence of technology has proven to transform the ever-changing course of education towards improvement. So as researchers, this is the best opportunity to gain a deep understanding of why and how this ICT has a role in improving students learning outcomes(Abdullahi, 2013; Aslan et al., 2020; Suroso et al., 2021). As a means of

improving the quality of learning outcomes, this certainly has a fundamental reason for changing the mindset of educators so that they perceive ICT to be included in learning programs and produce optimal student learning outputs. Therefore, understanding the role of ICT needs to be explored and communicated to a broader audience so that the existence of educational software and its innovative role is helpful for the development of learning and even material for consideration in making policies on the use of the electronic tools in academic activities (Livingstone, 2012).

Many studies have proven the close relationship between ICT and student achievement; all the experts agree that most of the problems faced where it is not easy to improve student achievement as expected by the government, parents, and society(Adnan & Anwar, 2020). So, in this case, many reports were also published by experts like education technology researchers who concluded that the adoption of information ICT certainly has a very positive relationship with student learning outcomes in several previous studies. Since the era of reform and technological developments in Indonesia, it is easier to get an assessment and measure how much influence information technology has in improving student achievement(Garris et al., 2011; Hendriarto et al., 2021; Nugraha et al., 2021). Such a relationship is possible because education policy believes in the linkage of many variables, such as the technology model involved, how the support from the teachers in the classroom, and how the benefits of technology can be conveyed to the parties, including parents of students. Apart from the excellent contradiction, ignorance of how to use ICT in education is also genuine because technology is a new thing in educational practice in Indonesia, especially when it is not able to be presented in all learning contexts and reasons for financial limitations and other support such as teacher human resources and school leadership. Thus enabling the practice of technology-based learning is often an obstacle of view (Agudo-Peregrina et al., 2014).

The connection between ICT and the learning climate can be concentrated by performing thorough or related investigations. The principal considers viewpoints like admittance to new advances, recurrence of purpose, and ability as the end purpose concentrate on regions pointed toward distinguishing potential holes(Adeyemi & Mary, 2013). The second investigates the relationships between's factors. Both are performed with the extent of observing execution against a bunch of explicit focuses through benchmarking. At a European level, the connection between ICT and the learning climate is concentrated by embracing a cross-country near approach. The job of educators and instructional methods are integral to comprehending the connection between ICT and inventive instructing rehearses. Concentrating in this field will generally execute an experimental methodology, engaging educators and intently including them as creators of new practices. In such plan research projects, administrative systems being used are likewise examined and determined to distinguish potential hindrances presented, affecting the new practices under development(Tokareva et al., 2021). As expressed beforehand, strategy producers are keen on causal connections between factors that, according to an examination viewpoint, can be surveyed by carrying out thorough plans like randomized investigations and vital assessment techniques. Be that as it may, these plans are tedious, costly, and need to consider the administrative system substantially. Moreover, trial plans can be deterring and challenging to oversee at the strategy level when none of the intercessions tried work (Fu, 2013).

The primary test is about the definition and the estimation of learning results: what results do we need to gauge innovation's effect? These days, we see that the focal

point of policymaking and research is moving from conventional learning results to the appraisal of skills and accomplishments(Biagi & Loi, 2012). Hence, restricting the investigation of the effect of ICT on expected learning results may not do the trick any longer. The subsequent test is about to limit working in proof-based strategy. There is a rising interest for proof from the arrangement level on new points, which requires more skill to be accessible inside services and public experts in the space of exploration. This features significantly more that, particularly in schooling, the limit building requires an eco-arrangement of specialists, strategy creators, and professionals based on stock and supported trades. An essential part of the limit building is that a combined cycle is tough to support in a setting that develops continually and with a rising rate: how might we construct the proof corpus when interest for proof develops and quickly changes center because of the speed of development in innovation?(Ghavifekr et al., 2016).

The third and last test concerns the need to build research organizations and embrace a multidisciplinary approach. Like this, a new report of the European Parliament reasons that the pertinent inquiry is not on the off chance that legislatures ought to put resources into instructive innovation yet how states ought to dispense financing to enhance schooling systems through innovation(Derrick et al., 2004). Instructive innovation incorporates a wide cluster of advances and techniques molded by partners' ways of behaving and impacted by context-oriented factors that, if blended enough, can add to understudies and educators better accomplishing their objectives. An essential and single intercession cannot tend to such a vast and complex undertaking. Exhaustive on-going approaches are required, covering innovation, procedure, financial and administrative viewpoints; also, such strategies are subject areas of strength for to's commitment. Here we should advance by doing; consequently, cautiously surveying the consequences of the various mediations is vital to guaranteeing success.

The requests of the Government of the Republic of Indonesia concerning the need to use ICT in training show that this innovation is perceived as having substantial positive advantages for the viability of schooling(Farida et al., 2020). This urges advanced education to contend with taking on ICT and, surprisingly, become the way to imaging and "promoting." Not just reception, the authority of IT and ICT usage abilities is additionally essential for the educational plan, which is seen to very "sell." Related areas of science and different areas, like sociology. In specific fields of study, rebranding was even completed by adding "industry," which was related to the utilization of ICT, for instance, 'innovation' - at first science, 'modern social science at first humanism(Ediyanto et al., 2018). Not just names of study projects or fields of concentration, but also on courses like web-based reporting, e-advertising, and internet showcasing. This rebranding and rebuilding of the educational program are accepted to have the option to construct the picture and nature of schooling, including empowering the "market" to be more enthusiastic. Bates and Wulff, as cited bySiahaan, (2004) specifies a few benefits of advancing by using web-based ICT displayed in the accompanying: (1) expanding the degree of learning cooperation among understudies and educators or teachers (improve intuitiveness), (2) can do anyplace and whenever. The idea of web innovation that does not need synchronization makes this conceivable, (3) it is genuinely equipped for contacting a vast worldwide crowd, and (4) it is simple and quick to refresh learning materials and store information (Pamoragung et al., 2006).

Based on the explanations and problems above, today's learning at the university level is very focused on information technology because technology is proven to innovate learning outcomes in universities (Nagelhout et al., 2014; Hendriarto, Aslan, et al., 2021). We as researchers are called to continue to update ourselves to become happy with individuals involved in teaching and providing technology; for that, we want to deepen our understanding of whether technology has provided the effectiveness of learning fibers, especially where we do the teaching. In addition, for educational purposes, a learning innovation is needed, which has now become something that has developed in some universities in the country, and this is what makes our desire to understand the role of information and communication technology in the place we work with this understanding. Of course, it will support our personal and other friends because we are part of an academic activity that continues to operate and make this science and theory a part of college governance (Burgos et al., 2020).

Likewise, because the technology helps the decision-making process for our university, we are part of the policy-making at the university; of course, we will have the desire to continue to update ourselves to be able to operate and entrusted to us to update ourselves in various ways that technology has (Hummel et al., 2015). Therefore, to understand how technology is capable of innovating, yes, with the functions that technology has, we have stages of educational services that we can adopt into teaching later in the course of the study, we find entirely new things, so we will make adjustments and relevance to what we have at the university and what is expected by the public, especially students and the wider community. For this reason, we carried out this study, among others, hoping to gain recognition and perspective from academics at the Computer Information Technology Management College of Tasikmalaya.

METHODS

We conducted a series of data searches, including interviewing nine submitted sources that asked seven questions to lecturers' academics and two to students (Szymkowiak et al., 2021). The interview process involves voice recording in the form of a streaming structure interview. Furthermore, after data collection, the data in audio is transferred to text data, and then we analyze it under a phenomenological approach, which is an approach to understanding a phenomenon from many existing data. While other data we get by searching electronically, we also conduct field observations considering the location of data collection at our place where we carry out daily services. Our data reporting is done qualitatively where the data referred to here is sourced from 2 secondary and primary. ADDING Documentations In reporting, we follow the reporting system of qualitative studies that have been carried out previously, where we see the effectiveness of the use of ICT both in teaching and evaluation so that we can see the effectiveness of technology for improving student learning outcomes. We started with formulating the problem of finding the ease of finding gaps in the introduction, then continued with the search for data, data analysis, and reporting results (Bond et al., 2018).

RESULT AND DISCUSSION

We repeat this qualitative study to understand the role of ICT in transforming student learning outcomes in higher education, precisely at STMIK DCI Tasikmalaya. In this section, we will describe the results of data analysis from a series of sources, including interviewing ten resource persons from the academic elements of the

Tasikmalaya High School and adding review data and author observations. At the same time, the results of this data will be discussed in the next section (Šorgo et al., 2017).

To understand how the experience of academics in carrying out academic tasks, including teaching and evaluating student learning outcomes, we have interviewed some academics**.**

The first question is, can it be explained how useful it is in transforming learning and student learning outcomes at STMIK DCI Tasikmalaya high school?

> *Well, we will try to explain the use of information and communication technology in the transformation learning and teaching system. This information and communication system has impacted learning activities with its transformin, enablingenabled our learning to run forward and achieve faster results than conventional methods. Traditional learning. As it is understood that the role of this communication technology has been able to provide changes to our information governance system where we use these tools and information systems to manage learning activities that we believe have been able to produce better learning where the ability of machines to store, distribute, process and share information. So we repeat the role and function of this technology in teaching in front of our schools, which is to help improve our skills in teaching. Likewise, helping students to continue to innovate so that there is a very effective learning class and in the end, we can develop our professional skills in managing higher education which is, of course, the goal to improve the quality of student learning (participant#1).*

Here, based on the answers above, we can understand that the university, stating the role and function of information technology in general, has been able to improve learning services which include the use of technology to obtain information, manage and convey information so that learning will become more accessible and end academics Able to improve student learning outcomes effectively and productively.

Those are the functions and roles of information technology at STMIK DC Tasikmalaya high school.

The next question we directed intending to understand how information technology can transform and the high they run, especially related to improving the quality of student learning outcomes.

The question is, how is information and communication technology transforming education in your college environment?

> *ICT, we believe that she can improve the quality of learning outcomes in several ways, such as adhesion can increase students' motivation and their involvement will be very high. Likewise, ICT, which can facilitate students in obtaining basic skills in each lesson, can also improve the teaching quality of lecturers. So in our university environment, we see that today's ICT is genuinely transforming and promoting student-oriented learning; in other words, with help from top academics can automatically increase awareness of autonomous learning" (participant#2).*

Based on the answers given above, it can be concluded that ICT in the learning environment at STMIK Tasikmalaya can improve the quality of learning outcomes in various ways, such as increasing motivation, increasing self-confidence, making different and facilitating students and lecturers to improve their learning due to the presence of CDs in the environment. Academics are in line with the times' demands, which promotes student-based learning compared to the traditional system where the learning orientation is only teacher-centered, not student-centered.

In the second part, how is ICT may transformation of teaching and learning tasks?

> *Okay, first of all, we see that ICT allows for improving the quality of education as a whole where it is not so far away how ICT functions on students as well as it functions to transform teaching tasks such as how lecturers look for information, it is easy to process information. It is easy to transfer information to students. Accelerating learning and teaching yields different results from the past when technology was not yet an option. So ICT makes it easy for teachers to transfer knowledge and skills by promoting student-based learning for independent learning (participant#3).*

ICT in this third question, the resource person revealed that ICT had provided opportunities for teachers to improve the quality of teaching and learning outcomes where the existence of ACT has enabled teachers to work and obtain information sources, process and transfer it to students so that students will finally get a quick understanding and ultimately make students becomes a learner compared to other ways of learning without involving technology. In other words, ICT can expand and accelerate transformation because of its power and modalities that impact transformation for learning purposes so that it can save learning and find the desired learning objectives compared to the old ways.

The next question is why the role of information and communication technology is essential in the department you run.

> Information and communication technology have become a cornerstone in all *aspects of life because it provides a more advanced, better, and faster way for people to communicate, socialize, support, and get information. When returned to academics, this is a highly anticipated presence due to the convenience technology can encourage the achievement of academic goals, namely to differentiate students to get the optimal learning experience possible. Compared with the experience before the technology, the desire to get instant, fast and different learning outcomes is impossible. This is why the role of this technology is significant for the development of academic tasks at this Tasikmalaya high school (participant#4).*

As mentioned above, data and correspondence innovation has become a foundation in all parts of life since it gives a further developed, better, and quicker way for individuals to impart, mingle, get support, and get data. Returning to scholastics is a profoundly expected presence because the comfort innovation can support the accomplishment of educational objectives, specifically to separate understudies to get the ideal opportunity for growth. Contwithted and the experience before the innovation, the lfor to get a moment, quick and different learning results is inconceivable.

Furthermore, we also want to understand examples of the function of information technology for academic purposes, especially for students. Can you ethat ICT is very helpful for academics such as students?

> *In this case, the most accessible and most frequent examples we get from the use of this technology include that with this technological facility, learning activities, in general, have adopted technology for everyday life, for example, when lecturers and students need a means of sending information such as email, the informatics is very useful for establishing a relationship between lecturers and students. When doing conferences, they can make video calls with several students. Also, in parallel, when students need faster information, then they can browse. The students also use this technology in various*

models such as tablets, cellphones, and other laptops. So those are among other examples of the use of IVD in our academic environment (participant#5).

So based on the answers above, which were asked for examples of the use of this technology, it seems that several functions are commonly used, for example, to send information accurately, so students are allowed to use email later, especially during a pandemic, they use video calls and then look for information using the internet and several examples of interests commonly used in academia.

Next, we also asked why lecturers and academics are interested in using information and communication technology in their classrooms. Through this question, we will get in-depth information about why academics rely on technology for each unique and online teaching class.

The question is, why do academics trust information technology in their classrooms?

The most basic reason is that we see the benefits of technology. Benefits include transferring the experience and understanding of lecturers to digital literacy transfers. With us transferring digital literacy skills later, students will become independent, allowing lecturers to produce student learning outputs more quickly because technology allows student academics to get any information. What they want with various models of home formats even now some of our classes have used such as interactive whiteboards, which is especially for those who read undergraduate, so that is why we adopt information technology into the classroom to remember the benefits and innovation power of these technologies (participant#6).

Based on the answers above, we can understand that the reason the academics at Tasikmalaya college uses technology is the principle of benefit, and the technology is compelling in transferring literacy skills and also other conveniences played by technology such as getting information and being a tool in teaching such as interactive boards.

We see that the higher education you are fostering has been very good at using technology in academic services. Nevertheless, We would like to get into more detail.

What makes your department passionate about adopting this educational technology?

I think we can say that there are quite a lot of advantages that we get when we adopt technology into academic services we can say; for example, before there was technology, we tended to have meetings almost every week, and in those meetings, we could not cover messages and ideas that we have to convey to our community. However, since we adopted technology in academic services, everything has become easy; for example, the communication mode is very intense, then we can automatically save costs because we have to meet, rent a place or have to gather often with transportation, but with our technology, we can easily coordinate things that need to be communicated immediately, as well as our habits. In the past, we used quite a lot of paper along with the policy going green. Then with this technology, the teaching and learning process is quite interesting. The data we get is also relatively easy; we are okay, so this is effective and efficient in time and money, then it is a bit easier than before. That is partly what we feel; we put our hope and trust in technology in the transformation of education at our university.

It could be added that earlier it was related to the function and prevalence of technology used at the university you are currently developing. We want to get an understanding of the function of technology, say for the learning process in the

classroom; for example, we know that high turnover involves academic work assignments and management of cost management. related to learning to write scientific papers and other functions that directly improve the quality and learning of students.

Could you explain the most concrete function to improve student learning outcomes in the department of each course that students take?

> *Well, as we explained above, maybe this time I will detail the use of technology in learning, significantly improving students. This includes several functions, including technology can process data, then we use technology as a methodology for learning development where children are always given assignments for writing, for example. They have to use research systems such as data coding, programming data, then research data; they can also often convert data, storage, retrieval, design, analyze systems, and systems familiar in the academic world are given high. So practically, where the technology can help increase student motivation in learning and motivates them to practice and continue to convince students to take advantage of all forms of technology benefits so that they can solve their problems and ultimately improve the quality of learning as expected (participant#7).*

The data is understood that student education technology is given convenience in completing tasks such as research methodologies, searching for data, coding data, evaluating data, analyzing, storing, and synthesizing data, as well as reporting and communicating data in the form to lecturers and the role of technology in addition to being general but also specifically in the class to solve problems experienced by students.

Besides, we asked about the development of the use of information technology from the lecturers and teaching coordinators; we also met some students whom we asked how technology helps them as point students as we know that all the activities are carried out. We believe all the different supporting facilities aim to improve the quality and organs of student learning. That is why we ask this question.

How does information technology help you in this learning program at the University of Tasikmalaya?

> *There are several advantages of technology that we use every day; for example, in finding information, what we do today, with our technology, it is easy and fast for us to access what we want. The information we get is beneficial in learning or what we often hear is that innovations in e-learning make it easier for us in education as a whole. Then when asked about the benefits, first of all, using technology as a means of support for us and also a supporting market for lecturers in finding information quickly and widely and sources that we can prove. Whereas in supportive learning, firstly, improving the quality of learning, expanding access to information, and getting something we cannot in the real world. However, with our technology, it is us to understand learning and display or reflect on what we need fast possible to get ideas, which includes again being able to make it easier for (participant#8).*

As mentioned above, the benefits for students include making it easier to get complete and broad information so that students are helped in solving the problems we face as students.We also asked about the views and reasons why students believe in technology or ICT.

Why are you obliged to pursue technology media in your lectures?

> *First, the university has required every student to have skills in using this technology, especially the most basic ones. After we studied by taking guidance from various sources, we finally felt very stimulated to continue learning, and we felt this was very important when we solved our problems in each course; there were tasks that we had to do involving research and also processing data later with With this technology, we become more creative and learn more independently. We also feel a massive development because we have the skills to use this technology even though it is still at a primary stage. We also see friends who are proficient in technology. They are easy to solve every problem, so, on average, they have a relatively good potential value. We believe that is why technology should be happy with our learning.*

Based on the students' expressions above, we can conclude that every campus has indeed required the first technology; however, after they get the basics, they continue to feel the benefits where students make it easier to solve the problems they face in each course, and fact students who have these skills will find it easy to learn. All college matters, and the evidence is that they, on average, have very satisfactory learning outcomes.

In addition to asking about the effectiveness of technology in learning, research lecturers and students also participate in how vital technology is to provide effectiveness for the evaluation or final assessment of learning.

The question is, how important is technology in making student learning assessments effective?

> *The use of technology in evaluating student learning is essential, considering that each evaluation requires an instrument that can measure what must be measured in real-time. So the use of technology as an assessment measuring tool is one way to help teachers or lecturers in processing evaluation activities; this technology makes it easier for examiners to understand evaluating and explain which learning outcomes have been completed, and in other countries, technology provides convenience in many ways including evaluating student learning outcomes (participant#9).*

As given above, academics at the University of Tasikmalaya have proven that using technology is not only to enter learning programs but also to evaluate learning outcomes as expected in such a quick practical evaluation so that no evaluation does not produce what evaluators want to achieve.

Table 1 The Result Observation at STMIK DCI Tasikmalaya

No	**Review Section**	**Description/Comments**
1	**SUBJECT MATTER CONTENT** (All academic individuals such as teachers and students have shown good command and knowledge of applying ICT; demonstrates use of technology and depth of ICT mastery for academic and working mastery.	It seems that using information technology is very challenging, but when students can complete all assignments and take part in learning well, it finally looks fun. This is because students and lecturers have provided students earlier.
2	**ORGANIZATION** We saw academic activities have been organized well; fair evidences and preparation; is thorough; course coordinators have stated clear	We want to see that the organization and implementation of addition has gone well where every student is required to have a computer and they are provided with understanding and able to use computers for

	learning and working objectives; emphasizes the importance of ICT uses and summarizes main points of using ICT, academic axpectation have met the class at scheduled time, university has conducted a regularly monitors both face to face and on-line course of use ICT)	learning and also final evaluation.
3	**TEACHING AND LEARNING METHODS** (University has used relevant learning and learning methods, aids, madia and materials, techniques and strategy, and technology(laptop, computer, tablet, and smartphone; includes uses of simple tools, clear guidence, precise instruction, and appropriate use of information; technological use of activities stay focused on and meets the need of student learning outcomes).	In terms of teaching and learning where universities have used relevant methods for learning where they have generally used holy water and also strategies that require all students to be able to use various kinds of technology-based learning tools with good guidance as well as activities which they focus on meeting student needs.
4	**PRESENTATION** (establishes online course or classroom environment conducive to learning; maintains eye contact; uses a clear voice, strong projection, proper enunciation, and standard English).	While the use of technology is not only carried out in the school environment but also used in the context of learning outside the classroom; where when schools are closed in response to the pandemic, they also continue to use technology so that they can be told that technology has been running and is used according to its function.
5	**MANAGEMENT** (Schools have used time wisely; students attended to course communication and interaction; academic individuals have demonstrated strong leadership ability; maintains discipline and control; maintaining effective e-platform management and achieving higher learning outcome).	Governance of the use of technology is appropriate where the coordinators wisely issue rules and management so that interactions between students and students as well as lecturers and students have also been able to use ICT following learning standards and for evaluation where the university also controls and maintains moment of using technology in a governance manner that is related to student learning outcomes.

DISCUSSION

Based on the presentation of the observation report at STMIK DCI Tasikmalaya, we can conclude that judging from the core problems of using information technology here; we can understand that both students and lecturers have shown mastery of learning well indicated through the use of addition, not only for the learning process but also for teaching and learning. But they have succeeded in using the edition for the assessment or evaluation process through various final assignments every semester. Thus, we can say that the learning content at the STMIK Tasikmalaya school is in line

with expectations where the use of informatics is not only for learning but also helpful in entering the world of work in the future (Lazić et al., 2021).

Likewise, when we look at the section on how organizational leadership is at the STIMK Tasikmalaya, where academic activities have been well managed, where college preparation is also given, students are also given clear instructions on how to work and emphasized the importance of using information technology so that the expectations of every course or lesson which is scheduled can be achieved. Continuous monitoring and evaluation are carried out regularly. Thus, this is in line with expectations where ICT governance and other learning activities are indeed based on school managerial governance, which emphasizes the achievement of learning outcomes.

Likewise, when viewed from the teaching and learning method here, the school already has relevance between what it wants to achieve and what is provided by the school in terms of the learning process through forms that are relevant to good learning media and also techniques and strategies where every student has been able to use laptops, tablets, computers and also on other bases with proper use and working instructions that adapt to the focus on finding what students need not only in terms of each learner but also oriented towards achieving evaluation results and will also have an impact on every graduation when entering the world of work (Bates & Sangra, 2011).

Therefore, we see how academics, such as students and teachers, have used technology and information-based learning for both Faces to Face learning in schools, and the use of technology for distance learning has been proven during the response to the pandemic. Likewise, governance in general, both the use of time and attending lectures to interact with academics and how the role of the academic has demonstrated their ability to lead in the technology sector. In addition, how discipline can be maintained and controlled to ensure that electronic-based learning governance and its activities enable the achievement of learning outcomes which is expected (Toro & Joshi, 2013).

We repeat that this study was carried out to understand the role of information and communication technology in transforming student learning outcomes at the Tasikmalaya Computer Science Management College. Through interviews and literature review, we have received input from the academic community and students on information technology's role and function in improving student learning outcomes(Heath et al., 2015). Among other things, we have found that the use of information technology in learning activities in the schools in question is that the existence of information technology in learning activities in Tasikmalaya has allowed learning to achieve speedy results compared to learning methods before the emergence of educational technology. So the existence of ICT is believed to have improved the quality of learning in several ways, including technology facilitating students to achieve basic skills in learning. With these skills, they can learn independently with high motivation and get the desired results (Msila, 2015).

In addition to the existence of this technology, it helps lecturers in teaching and solving all problems related to learning activities in the era that is now being reviewed by technology, the existence of this technology has also allowed students to learn actively to achieve unlimited access to information and allow students to do personal live learning(Ahsan et al., 2022). In other words, students have learned to the maximum with the autonomous learning approach following what today is proclaimed independent learning or more independent learning. So this technology is

indeed following the learning method or approach, which is no longer a student-oriented center. We also find that this information technology is not only used as a method or means to facilitate lecture activities at the University of Tasikmalaya but technology has also been used. Enable students to solve problems in their lectures, such as searching for data, processing data, communicating learning outcomes efficiently, and following the functions created to facilitate learning with the orientation of the productivity of learning outcomes to be achieved (Lazić et al., 2021).

Therefore, academics also describe technology that does not only function for teaching but has also been used for evaluating student learning outcomes. Thus, we have obtained a series of information and observations that we did at the Tasikmalaya College of Computer Management. We believe that learning the data income method certainly has weaknesses and limitations. Therefore we hope for feedback and improvements to improve writing studies in the future(Bates & Sangra, 2011).

The implication of using information technology at every level of lectures and courses at the computer informatics and management science university in Tasikmalaya is that university policies require every student to deepen the use of computers for learning and even for work purposes; the students have become more focused and firm(Sarkar, 2012). They study computer science, of course, intending to make learning easier for the first time and will later have self-preparation when entering the world of work and other careers. So with the principle of the benefits obtained from this information technology, it will support their learning while they are still in college and improve their learning outcomes. Then based on the answers given, the wider the students' ability to master computer science, they will automatically be able to expand their access. To get information and communicate Because the purpose of their lectures on the computer is to, among other things, get easy access to information and support their learning (Toro & Joshi, 2013).

Then with the more handsome students in terms of computer science, they will expand the learning network and also work, and of course, this is to make it easier for students to master every material being studied, and of course, it will also make it easier for them to evaluate their ability to master computer science. The implication of getting this data is that the use of information technology is believed to have increased the motivation and enthusiasm of students to study science and have skills which are the goals of implementing education at the Tasikmalaya Islamic computer science school (Pegu, 2014).Based on the recognition of several academics, it has been proven that the use of computer science and other informatics has a significant influence on student learning outcomes because the effectiveness and innovation power obtained through computer technology-based learning is real and has proven to have renovated and at the same time transformed learning compared to other methods—moreover, ways of learning before the birth of information technology that supports every academic activity (Ali, 2020).

What we have found is that the computer science high school in Tasikmalaya is part of the development of information and communication technology which has been understood to play a role in managing education and teaching where we see the role of ICT has helped students in obtaining information, making learning more accessible and also more accessible in the evaluation and the world of hard work (Sarkar, 2012). What happened in STMIK Tasikmalaya certainly had an impact on the progress of the world of computer-based education, which today is undoubtedly very important for other computer science colleges to follow where the smoother the students' ability to use technology, the easier it is for them to succeed in learning and

also in entering the world a job where skills supported by computer technology will provide innovation and also a transformation towards technology-based education(Toro & Joshi, 2013).

The researchers feel that there are some limitations that we experience and can be some of the factors that can be given more attention to future researchers in further perfecting their research. We believe this research has shortcomings that need to be improved in future studies. Some of the limitations in this study, among others: The number of respondents was only ten people from one high school. Of course, it is still not enough to describe the actual situation. The object of research is only focused on semi-structured interviews, which is only one of many other methods with a lot of information source activity. In the data collection process, the information provided by the respondent through question and answer questions sometimes does not show the respondent's actual opinion; this happens because sometimes there are differences in thoughts, assumptions, and different understandings for each respondent, as well as other factors such as honesty in filling out respondents' opinions in interviews and review of information.

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AUTHOR CONTRIBUTION STATEMENT

All authors have contributed and participated in conducting research, and approved the final version of the manuscript

CONCLUSION

As for the results that we have obtained through 3 methods, namely documentation, interviews, and also observations at the lecture venue, among others, we understood that the role of this information technology has been able to transform student learning outcomes where first, the academic side has required every student to master the skills in computers. They had also used it to solve the problems they faced in class and the skills they had planned for the benefit of supporting career tools in the future. Provide convenience for the implementation of lectures, but also they get convenience in evaluating student learning outcomes where technology allows getting data that is entirely accurate and informs it more precisely so that the parties will get the satisfaction given by the technology. These are the results, among others, that we have obtained through a series of research methods, and we believe this will be useful for the study of computer science and learning outcomes in universities in the future.

REFERENCES

Abdullahi, H. (2013). The Role of ICT in Teaching Science Education in Schools. *International Letters of Social and Humanistic Sciences*, *19*, 217–223.Google Scholar

Adeyemi, I. I., & Mary, E. (2013). ICT and higher educational system in Nigeria. *Educational Research and Reviews*, *8*(21), 2021–2025.Google Scholar

Adnan, M., & Anwar, K. (2020). Online Learning amid the COVID-19 Pandemic: Students' Perspectives. Dalam *Online Submission* (Vol. 2, Nomor 1, hlm. 45–51). Google Scholar

Agudo-Peregrina, Á. F., Iglesias-Pradas, S., Conde-González, M. Á., & Hernández-García, Á. (2014). Can we predict success from log data in VLEs? Classification of interactions for learning analytics and their relation with performance in

VLE-supported F2F and online learning. *Computers in Human Behavior*, *31*, 542–550. https://doi.org/10.1016/j.chb.2013.05.031

Ahsan, K., Akbar, S., & Kam, B. (2022). Contract cheating in higher education: A systematic literature review and future research agenda. *Assessment & Evaluation in Higher Education*, *47*(4), 523–539. https://doi.org/10.1080/02602938.2021.1931660

Ali, W. (2020). Online and Remote Learning in Higher Education Institutes: A Necessity in Light of COVID-19 Pandemic. *Higher Education Studies*, *10*(3), 16–25.

Aslan, A., Silvia, S., Nugroho, B. S., Ramli, M., & Rusiadi, R. (2020). Teacher's leadership teaching strategy supporting student learning during the covid-19 disruption. *Nidhomul Haq : Jurnal Manajemen Pendidikan Islam*, *5*(3), 321–333. https://doi.org/10.31538/ndh.v5i3.984

Bates, A. W. (Tony), & Sangra, A. (2011). *Managing Technology in Higher Education: Strategies for Transforming Teaching and Learning*. John Wiley & Sons. Google Scholar

Biagi, F., & Loi, M. (2012). ICT and Learning: Results from PISA 2009. *Luxemburgo: Joint Research Centre, Instituto para la Protección y Seguridad del Ciudadano [Comisión Europea]*.

Bond, M., Marín, V. I., Dolch, C., Bedenlier, S., & Zawacki-Richter, O. (2018). Digital transformation in German higher education: Student and teacher perceptions and usage of digital media. *International Journal of Educational Technology in Higher Education*, *15*(1), 1–20. https://doi.org/10.1186/s41239-018-0130-1

Burgos, C. E., Rodríguez Jerez, S. A., Piñeros Veloza, I. P., Moreno Melo, C. A., Morales Piñero, J. C., Molina Bernal, I. A., Ramírez Acosta, N. E., Hernando Vargas, S., Castro Cortés, C. C., Martínez Molina, B., Angulo, S. A., Flórez, M. P., Duarte, D. M., Ángel, L. A., Díaz, A., Potes Comas, I., Ramírez, J. D., Cordero Saez, N. O., & Latorre Iglesias, E. (2020). *ITC, innovation in the classroom and its impact on higher education*. Universidad Sergio Arboleda ; Ascolde. Google Scholar

Derrick, E. G., Falk-Krzesinski, H. J., Roberts, M. R., & Olson, S. (2004). *Facilitating Interdisciplinary Research and Education: A Practical Guide*. 44.

Ediyanto, E., Mulyadi, A., Supriatna, A., & Kawai, N. (2018). The education and training program guideline for special guidance teacher competence development in Indonesian inclusive school. *Indonesian Journal of Disability Studies*, *5*(2), 251–267. Google Scholar

Farida, I., Setiawan, R., Maryatmi, A., & Juwita, N. (2020). *The Implementation of E-Government in the Industrial Revolution Era 4.0 in Indonesia*. *22*, 340–346. Google Scholar

Fu, J. (2013). Complexity of ICT in education: A critical literature review and its implications. *International Journal of Education and Development Using ICT*, *9*(1), 112–125.

Garris, R., Ahlers, R., & Driskell, J. E. (2011). Games, motivation, and learning: A research and practice model. Dalam *Simulation in Aviation Training*. Routledge.

Ghavifekr, S., Kunjappan, T., Ramasamy, L., & Anthony, A. (2016). Teaching and Learning with ICT Tools: Issues and Challenges from Teachers' Perceptions. *Malaysian Online Journal of Educational Technology*, *4*(2), 38–57. Google Scholar

Heath, D., Maghrabi, R., & Carr, N. (2015). Implications of information and communication technologies (ICT) for school-home communication. *Journal of Information Technology Education*, *14*. Google Scholar

Hendriarto, P., Aslan, A., Mardhiah, Sholihin, R., & Wahyudin. (2021). The Relevance of Inquiry-Based Learning in Basic Reading Skills Exercises for Improving Student Learning Outcomes in Madrasah Ibtidaiyah. *At-Tajdid : Jurnal Pendidikan Dan Pemikiran Islam*, *5*(01), 28–41. https://doi.org/10.24127/att.v5i01.1473

Hendriarto, P., Mursidi, A., Kalbuana, N., Aini, N., & Aslan, A. (2021). Understanding the Implications of Research Skills Development Framework for Indonesian Academic Outcomes Improvement. *Jurnal Iqra' : Kajian Ilmu Pendidikan*, *6*(2), 51–60. https://doi.org/10.25217/ji.v6i2.1405

Hummel, K., Hoving, C., Nagelhout, G. E., de Vries, H., van den Putte, B., Candel, M. J. J. M., Borland, R., & Willemsen, M. C. (2015). Prevalence and reasons for use of electronic cigarettes among smokers: Findings from the International Tobacco Control (ITC) Netherlands Survey. *International Journal of Drug Policy*, *26*(6), 601–608. https://doi.org/10.1016/j.drugpo.2014.12.009

Lazić, Z., Đorđević, A., & Gazizulina, A. (2021). Improvement of Quality of Higher Education Institutions as a Basis for Improvement of Quality of Life. *Sustainability*, *13*(8), 4149. https://doi.org/10.3390/su13084149

Livingstone, S. (2012). Critical reflections on the benefits of ICT in education. *Oxford Review of Education*, *38*(1), 9–24. https://doi.org/10.1080/03054985.2011.577938

Majumdar, S. (2015). Emerging trends in ICT for education & training. *Gen. Asia Pacific Reg. IVETA*.

Msila, V. (2015). Teacher Readiness and Information and Communications Technology (ICT) Use in Classrooms: A South African Case Study. *Creative Education*, *06*(18), 1973. https://doi.org/10.4236/ce.2015.618202

Nagelhout, G. E., Putte, B. van den, Allwright, S., Mons, U., McNeill, A., Guignard, R., Beck, F., Siahpush, M., Joossens, L., Fong, G. T., Vries, H. de, & Willemsen, M. C. (2014). Socioeconomic and country variations in cross-border cigarette purchasing as tobacco tax avoidance strategy. Findings from the ITC Europe Surveys. *Tobacco Control*, *23*(suppl 1), i30–i38. https://doi.org/10.1136/tobaccocontrol-2012-050838

Nugraha, M. S., Liow, R., & Evly, F. (2021). The Identification of Online Strategy Learning Results While Students Learn from Home During the Disruption of the COVID-19 Pandemic in Indonesia. *Journal of Contemporary Issues in Business and Government*, *27*(2), 1950–1956.

Pamoragung, A., Suryadi, K., & Ramdhani, M. A. (2006). *Enhancing the Implementation of E-Government in Indonesia through the High-Quality of Virtual Community and Knowledge Portal Design*. 341–348.Google Scholar

Pegu, U. K. (2014). Information and communication technology in higher education in india: Challenges and opportunities. *International Journal of Information and Computation Technology*, *4*(5), 513–518.

Putra, P. & Aslan. (2020). Pengembangan bahan ajar berbasis imtaq dan iptek di era revolusi industri 4.0 pada mata pelajaran sains madrasah ibtidaiyah. *Ta`Limuna: Jurnal Pendidikan Islam*, *9*(1), 1–15. https://doi.org/10.32478/talimuna.v9i1.345

Putra, P., Liriwati, F. Y., Tahrim, T., Syafrudin, S., & Aslan, A. (2020). The Students Learning from Home Experiences during Covid-19 School Closures Policy In Indonesia. *Jurnal Iqra' : Kajian Ilmu Pendidikan*, *5*(2), 30–42. https://doi.org/10.25217/ji.v5i2.1019

Putra, P., Mizani, H., Basir, A., Muflihin, A., & Aslan, A. (2020). The Relevancy on Education Release Revolution 4.0 in Islamic Basic Education Perspective in

Indonesia (An Analysis Study of Paulo Freire's Thought). *Test Engineering & Management*, *83*, 10256–10263. Google Scholar

Sarkar, S. (2012). The role of information and communication technology (ICT) in higher education for the 21st century. *Science*, *1*(1), 30–41.

Siahaan, N. H. T. (2004). *Hukum lingkungan dan ekologi pembangunan*. Erlangga.

Šorgo, A., Bartol, T., Dolničar, D., & Boh Podgornik, B. (2017). Attributes of digital natives as predictors of information literacy in higher education. *British Journal of Educational Technology*, *48*(3), 749–767. https://doi.org/10.1111/bjet.12451

Suroso, A., Hendriarto, P., Mr, G. N. K., Pattiasina, P. J., & Aslan, A. (2021). Challenges and opportunities towards an Islamic cultured generation: Socio-cultural analysis. *Linguistics and Culture Review*, *5*(1), 180–194. https://doi.org/10.37028/lingcure.v5n1.1203

Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, *65*, 101565. https://doi.org/10.1016/j.techsoc.2021.101565

Tokareva, E., Malysheva, O., Smirnova, Y., & Orchakova, L. (2021). Predictors of the Use of ICTS in Higher Education: Relevance and Readiness of Universities for Their Implementation. *International Journal of Emerging Technologies in Learning (IJET)*, *16*(14), 166–183.

Toro, U., & Joshi, D. M. J. (2013). *A Review of Literature on Knowledge Management using ICT in Higher Education*. *4*, 6.