

PEDAGOGICAL SCIENCES

TEACHERS' COMPUTER LITERACY AS A DETERMINANT OF E-LEARNING QUALITY

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Abstract

This paper takes a close and detailed look at why it is so crucial for teachers today to know how to use computers effectively in online classrooms. As digital tools have now become such a big and permanent part of teaching and learning the question no longer is if we use them, rather it is how can we use them in the very best way in order to help students learn! This study claims that using a computer is not the same as knowing which button to push to turn a machine on. This actually turns out to be a much bigger and trickier idea that includes knowing how to use technology intelligently, thoughtfully, and in a focused way to achieve very specific teaching goals. The paper examines the ability to run programs, communicate and organize information digital skills. There is a difference between using a tool and integrating and creating with Technology, Pedagogy and Subject Knowledge to transform learning. Based on the theory of constructivists, confident teachers can create active environments on-line.

Besides digital literacy, the paper sheds light on digital self-efficacy or the teacher's belief in their abilities to use technology. Also, it discusses how their belief helps teachers to experiment with technology and stick with it amid challenges. It refers to technostress, due to rapid technological change, lack of time and insufficient institutional support. The takeaway of the conclusion is that education system change requires ongoing joint professional development, not one-off technical training. In the end, the study argues that teacher computer literacy is not an add-on, but rather a necessity for meaningful, equitable, and effective education.

Keywords: digital teaching, teacher computer skills, online learning quality, course design, student involvement, technostress.

In the last twenty years almost every school across the Earth has seen major changes in how teachers teach and how students learn. In other words: Most schools have transformed themselves completely by shifting from occasional use of digital technology to basically using digital technology full time for everything instructors do every day in a classroom setting. Today's normal teacher utilizes an internet platform and/or cloud-based software, audio-visual equipment and other alternative learning medium frequently during instruction. We have not simply put technology into our classrooms; rather, we have changed our classrooms through that technology [1; 6; 8]. Students are now learning through multiple ways of delivery whereby their traditional "live" classroom instruction is being supplemented with "on-demand" online instruction. The COVID pandemic led to an acceleration of that change as institutions needed to create new forms of distance learning very, very quickly and extensively. And although there will always be some physical infrastructure necessary, e.g. access to an internet connection and/or computer/tablet (etc.), that doesn't mean that students are receiving only good education simply because they are online. Teaching online now requires that teachers have digital skills in addition to teaching

content and general teaching knowledge. The degree of teacher digital literacy and digital self-efficacy is a key determinant in the success of digital learning for the students. Some educators are able to more effectively use the digital environment to produce challenging student-centered digital environments, while other educators use the digital environment to produce classroom-based passive content e.g. recorded lectures, lecture PowerPoints, etc. Students who have been exposed to a poorly developed, passive digital learning environment will not be as successful as their counterparts who have been exposed to a well developed, active digital learning environment; students who operate in an unsupported digital environment or operate in an environment where they passively receive information will be successful to the extent that their teacher is fluent in the use of the digital environment. The technology is basically creating an unfair experience for the students if the usage is not thoughtful and skillful. The issues are related to human success in technology as a learning tool and thus, need to be overcome. It's not just the access of students which is affected. So now, we must go beyond just providing access to digital tools to students. It is important to understand what teachers mean by "computer literacy" in the context of the digital world.

The concept lacks simple explanation nor has it a linear definition. Computer literacy essentially relates to the ability to use basic equipment and program features for living and working in a technologically based environment. Besides developing a basic functional knowledge of how to save/open files and manage simple technical Troubleshooting and running basically used programs as well as access to electronic mail and video conference technologies, computer literacy also involves developing digital communication skills through interacting politely/on-line/collaboratively via technology etc. which means knowing how to appropriately communicate (in terms of being clear, concise & polite etc.) when communicating online, how absence of cues/expressions affects one's manner(s)/language usage, and how to build/create Positive/Support Environment through Technology. etc. [8; 10; 14].

Digital literacy also refers to the ability to manage information-to seek it out, critically evaluate it, organize it and use it in an ethical way. For teachers this involves the important role of distinguishing credible sources from unreliable ones in order to provide appropriate resources to students. When teachers have developed the digital skills to do this they not only provide reliable information but they model effective digital scholarship for students and give them the tools they need to learn effectively in a digital world. The most significant difference, however, remains the ability to understand not simply 'how to' use a tool, but 'why' to use it in particular situations (pedagogy). Digital competence for teachers is not about just knowing what to do in the digital world, but how to best use technology to foster learning in meaningful ways.

The advent of artificial intelligence further extends the notion of digital competence to understanding algorithmic logic and ethics: teachers now must understand what AI is, how it works, and its implications regarding authorship, originality, and the purpose of learning itself when tools can produce essays or complete complex problems instantly. It becomes crucial for teachers to teach their students how to use AI as a tool for learning and thinking, rather than relying on its ability to provide easy answers, so that students learn how to make their own intelligent contributions to the classroom.

It is important to also realize the central role of digital self-efficacy in online teaching: teachers who believe they can do anything on the computer seem far more able and willing to adapt, experiment and persist in digital environments. When educators feel confident that they know how to manipulate technology and its associated platforms with proficiency and skill, they are far more willing to embrace challenges and integrate technology into their classrooms rather than relying on simplistic, familiar methods of online instruction [1; 2; 3].

Technostress is now a major concern among teachers: the constant need to adapt to technological changes, coupled with poor teacher training and the weight of demanding curricula and workloads can be overwhelming. The more frequently that schools update the technology, the less likely it is that teachers will feel comfortable with it, leading to further burnout

and frustration. The presence of supportive administration that provides access to adequate training and troubleshooting assistance can lessen the strain; thus, individual digital competence may still hinge on institutional support to promote and foster teacher development in these areas.

In approaching digital teaching and learning, constructivist learning theory is an extremely useful construct; it emphasizes the active creation of knowledge through personal experience, reflection and collaboration, a paradigm that the digital environment both supports and hinders. Static digital learning opportunities require only passive engagement from students while active, student-centered design can foster authentic learning. Highly digitally competent teachers use digital learning environments to foster interaction, experiment, reflect on experience, and work collaboratively, all in order to allow students to develop a deeper and more nuanced understanding of subject matter; for digital resources to truly enhance learning, they must be integrated meaningfully into pedagogical practice and allow students to pursue individual interests or develop their understanding at their own pace.

It is crucial that a good digital learning environment be intentionally constructed; it needs to have clearly defined objectives that the course will help students reach, logically presented and well organized resources that they will have easy access to, relevant activities and assignments that contribute to achieving the learning goals, and the criteria for the assessments must be clear. This thoughtful organization will prevent frustration on the part of the students as they are free to focus on learning rather than figuring out how to navigate their environment. Interaction is also key to effective online instruction: interaction with course content, the instructor and other students reinforces students' knowledge and increases their motivation in a manner that would be impossible without meaningful communication [5; 6].

Every student must have the opportunity to engage fully and without barrier in any given e-learning environment: providing equal opportunity and inclusive learning means taking into account not only factors of students' access to and abilities with technology but their sensory needs, learning styles, prior experience, and cultural background. Accessibility means offering a wide range of materials (both alternative and original, not just converted ones), varying methods of assessment (projects, performance-based, peer review), and accommodating a diverse range of needs (screen readers, captions, low-bandwidth resources). Furthermore, student satisfaction in digital learning environments is determined by clear directions, user-friendly interfaces, engaging materials and high quality interaction with both content and people; student success is driven by engagement and connection, both of which depend on meaningful pedagogical design.

The relationship between the teacher's sense of ability in using technology (digital self-efficacy) and the course design, and daily management are extremely important. Digital self-efficacy theory states that people are more likely to experiment, persist with complex tasks and approach challenges positively when they feel they have adequate skills and ability. In digital

learning, this Bridgestheory to practice and the bridge from passive information to meaningful construction of knowledge; teachers with high self-efficacy experiment more, learn new technologies faster, troubleshoot problems with greater resilience, and persist in using digital tools even when they are difficult to master. When it comes to using technology in education, however, confidence and competence are deeply intertwined; experience with technology naturally leads to confidence and the desire to learn more about it.

There are many barriers that prevent teachers from realizing the full potential of digital learning environments, but perhaps the greatest are tied to their own professional learning experiences. Rapidly changing technologies require continuous, taxing professional development that may not always be adequate; teachers struggle to keep up when new technologies need to be constantly mastered. This difficulty is compounded by heavy teaching loads and demanding schedules and it makes even well-designed online resources seem like another thing to worry about. Insufficient support from administration-access to stable internet, equipment, technical help, time to train, and a collaborative community-hinders teachers from fully embracing digital pedagogical innovation [3].

Collaboration between teachers is one of the most important means of learning and professional development and there is perhaps no space where this is more necessary than in a collaborative professional community for digital teachers. When teachers work together, designing online courses and learning opportunities, innovative ideas emerge that would be impossible for any individual teacher alone to produce. Through the sharing of digital materials, duplication of work can be minimized, and effective learning strategies can be widely adopted. Formal recognition of teachers who are developing effective digital learning opportunities is crucial in order to continue supporting the growth of the practice, which depends on and also enhances teachers' capacity.

The more teachers participate in the cooperative and collaborative aspect of digital learning, the more they will gain confidence and improve their practice. Learning sessions focused on designing digital courses and activities help educators to share their creativity and find new solutions together, sharing of resources is efficient and effective, and teachers should be recognized for the work they are doing in this arena. This is necessary in order to encourage ongoing skill development and the willingness to experiment in an educational setting that can sometimes seem stagnant; when teachers feel that their work is valued, they are far more likely to innovate and to continue to grow and expand their pedagogical capacity [10; 11; 12; 14].

Teachers who share responsibility with colleagues and receive adequate technical support are far more capable of handling rapid technological change. When teachers have easy access to assistance when technical issues arise, and have regular time set aside for peer work, the demands placed on them by technological change are significantly reduced. When this is not the case, there is simply less incentive for teachers to change their practices; when things work, they tend to work consistently with the resources available to them,

so that even basic technological competence coupled with strong peer support can contribute greatly to a positive learning environment in the digital age and the potential for positive student learning.

A pedagogical constructivist approach values the active creation of knowledge through personal experience, reflection and collaboration and it is the role of technology to enable such opportunities. As a rule, when opportunities for digital learning are focused primarily on passive information absorption rather than the development of ideas and content in active ways students are not likely to develop robust understandings. Teachers skilled in digital tools can utilize collaboration software, simulations, interactive games, and digital presentation tools to help students create meaning out of knowledge; digital skills are necessary so that teachers can use technology in an integrated, meaningful way rather than a fragmented, artificial one to enhance learning.

The difference between computer literacy (the skill to master complex technologies) and true pedagogical knowledge (knowing how to use whatever technology is most effective for student learning) can be huge; teachers can have an extraordinary grasp of complicated software or hardware, but still utilize those tools in a way that is not optimal for learning. Conversely, when a teacher has minimal digital competence but pedagogical knowledge, he/she can create extremely effective and powerful learning opportunities even with the simplest of tools. Evaluation of digital competence for teachers relies more on the effective application of technology for pedagogical ends than the knowledge itself, with a focus on teachers' integration of subject knowledge, teaching skills and technology application in a manner that fosters student learning.

The nature of teachers' computer literacy is evolving to include the knowledge of artificial intelligence, including the development of AI, and its ethical implications as AI has become a partner in teaching and students will inevitably interact with this technology and need to be prepared to work and collaborate with it in meaningful ways. AI systems carry the biases of the data they are trained on, and teachers will have to address these and help students understand the need for critical thought, and responsible and ethical application of AI; this knowledge of AI does add another dimension to the definition of teachers' computer literacy. The core concept of digital self-efficacy remains extremely important: it is important for teachers to be able to access and implement the relevant features in their digital devices and platforms with speed and ease as well as have a positive attitude towards technology, and use their confidence in the power of digital learning and the digital tools available.

Technostress is something that has become increasingly important for today's teachers; constant updating and changes in interfaces mean teachers need to be constantly updating their own knowledge and abilities, so as to allow themselves to continue learning new techniques to implement in traditional teacher tasks, which can be overwhelming for teachers already burdened by these new and difficult parts of teaching, resulting in burnout and frustration, the situation is made worse in institutions without strong support. The ability

to be in contact with and learn from technically capable others can take the stress out of constant updates, it is obvious that an individual teacher's skill and will are highly impacted upon by how a supportive institution is in allowing teachers to play with and explore technologies.

Professional learning communities seem vital to facilitating and developing teacher technology expertise; communities such as these offer space for conversation, sharing of experiences, and support, while teachers find their way around new teaching and learning contexts. Working together to build meaningful online courses is a logical outcome of teachers sharing knowledge and resources, thus facilitating learning that is likely much greater than could ever be taught by one individual teacher on their own. While we cannot and should not underestimate the individual's effort in engaging with the technology, such individual work must be appropriately compensated with awards, incentives or other means if it is to continue providing us with happy and confident experiences of teaching and learning.

Long-term, effective integration of technology requires more than hit-and-miss attempts; schools must commit to developing cohesive visions that unite technology with desired outcomes rather than rushing out to buy new equipment. Leadership is crucial in this pursuit, as principals play an important role in establishing a vision for the integration of technology and in allocating the necessary resources, along with modeling acceptable practices. School leaders are also critical in cultivating a climate that values pedagogical innovation and supports the professional development of teachers in using new technologies so that teachers will feel comfortable learning and engaging with new tools. Without robust and dependable infrastructure that allows for dependable and equitable access it will be impossible for teachers to successfully implement their new technological strategies.

The effectiveness of technology is highly dependent on the students' engagement with the technology. Just posting lecture material online does not guarantee deep learning. Vibrant online classrooms need interaction, opportunities for problem solving, and chances for students to express themselves with discussion boards, as well as other activities and multimedia resources. Clear structure of how the class will operate along with prompt feedback will make students feel more comfortable and willing to experiment in online class settings. It is also more likely for students to feel a part of the community and thus be more intrinsically motivated when interacting with other students as well as the teacher in a virtual space.

We must ensure equity and accessibility are central to technology integration. It must be clear that access to computers, internet, and supportive home learning environments is varied and must be planned for when creating assignments and selecting technologies. Offer various means of submission (downloadable and low-bandwidth versions of work) or flexible deadlines will diminish the inequities of access. Furthermore, ensure all content is accessible to disabled students (captions for video and audio materials, screen reader compatible word processing documents) and that there are

many avenues for students from diverse backgrounds to share their insights and perspectives.

Continuous reflection will be key to the teachers' success in this digital environment. Analyzing how their digital teaching approach worked, any problems encountered and student response will enable teachers to continue to improve over time. Teacher can use data collected from student assessment, student comments and peer feedback to guide their practice in ongoing improvement. This approach encourages teachers to move beyond automatic or habitual use of technology, to an intentional approach to integration, in order to continually develop their approach in an ever-changing educational and technology driven world.

The evaluation for web based learning should be tweaked so that it properly serves the role of assessment in an academic context. Standard online assessments do not seem to adequately test students understanding of the material. These might include: work assigned on projects, oral/open-note exams, Journals/reflective writings and collaborative group work. Digital assessment formats such as quizzes and "thumbs-up/thumbs down" style icons for understanding will give teachers a more immediate understanding of student achievement. Having explicit and transparent marking criteria is important to assessment authenticity. The assessment tool should reflect the learning goals and utilize digital content to truly test students comprehension.

Clear communication will be vital for a positive online learning environment. Opportunities for open and inclusive communication, such as announcements, online chats or discussion groups, email and virtual office hours, will all be opportunities to build student trust and ease their worries. Fostering positive online communication will require an intentionality for keeping conversations kind and clear. One should be conscious of the misinterpretation of one's message when body language and vocal tone are not available. Practices that promote online communication civility should be announced and understood by all. To promote comfort in a digital environment, instructor active listening will always promote a good learning environment.

Digital citizenship is the bridge for subject teachers to integrate critical skills needed for children to function in a digitally mediated society. Children must understand how to use discretion, good judgement, and appropriate and courteous behavior in online environments. Teachers should address students' need for awareness concerning privacy, protection of personal information, the ability to detect and avoid misinformation and the skill of respectfully participating in online dialogue.

Parental involvement can contribute to the success of children's digital learning experience, especially for the younger students. The communication school-to-home should be clear about expectations, daily schedules, and usage of technology. Providing guidance and instruction to parents on how they can be involved, particularly at home, will create more effective school-to-home connections. Family members who are aware of the course medium and course goals will be able to appropriately contribute positively and encourage obedience to study rules.

Ultimately, the goal of digital learning must be achieved with an appropriate balance. Technology should be viewed as something that complements and supports the face-to-face learning environment and pedagogy rather than something to overcome it. Educators will continue to be a mentor and a guide to students, while providing challenging and flexible opportunities. The integration of new technology may spark curiosity and greater opportunities for collaboration and the sharing of information among students, but it will only do so with the responsible use by the teacher and students involved. Sustainable digital change in the learning system will be fostered through proper training of teachers, inclusion of everyone involved, and a teacher's ability to engage in reflective practice. With all of these factors being considered, the implementation of technology will make for a revolutionary impact on the learning experience.

A related problem is teacher training. Schools providing training should prepare future teachers for more time to practice developing a computer course schedule, learning new classroom management software, and understanding the use of educational multimedia software, not just for the students. If they miss the step of practicing then there will be a gap between theoretical learning and pedagogical application. School systems and teachers have negative reactions to the initial stages of classroom digital implementation. It should be noted that while these training initiatives will assist teachers in incorporating the new learning systems into their classroom environments through the use of their teachers as mentors, they will ensure future teachers get the supervision and training necessary in a blended/online environment [7; 9].

What is blended learning? A blend of both traditional and online learning styles creates opportunities for the teacher to utilize a blend to create equilibrium in the classroom experience by adding more time-based flexibility, support for student and face-to-face connection. Less classroom time may be allotted as teachers lead more group discussion and independent work while still providing online support. This develops autonomy as well as time management skills. Clear coordination between both the online and classroom component should be developed so that learning can be optimized and various learning styles may be reached while avoiding overlap.

Utilising data to inform pedagogical choices is a practice that has become ever more important in digital teaching. The availability of learning analytics means that teachers can now 'track student progress, diagnose weaknesses and successes, and make adjustments for individual needs in a real-time environment'. However an ethic of care dictates that it should remain teacher led, transparent and with a need to protect students' privacy and autonomy in the collection and usage of the data. Appropriate use will build trust not undermine it.

Educational technology is a field that has constantly been expanding, new tools being developed all the time. New technology can offer a fantastic range of new ways of learning. Virtual reality simulation and highly interactive environments can now offer a real practical way of carrying out tasks and students gain practical experience in the learning process in ways that

simply were not possible before. It is crucial however that an educator thinks whether the new piece of technology really adds value to teaching or is it simply a gimmick that distracts from teaching and learning objectives [15].

Resilience, adaptability and a proactive stance in response to the challenges presented by emerging digital technologies will be necessary on the part of teachers, however change is a constant 'well beyond current expectations'. A growth mindset is essential to teachers interpreting challenges as opportunities and not insurmountable barriers. On-going professional learning, collaborative networks, reflective practice and professional development will contribute to teachers having the confidence to lead students into an increasingly digital future and maintain teacher expertise. A digitally competent teacher will foster an innovative and accessible learning environment [4; 13].

The role of school policy in supporting effective digital pedagogy can not be stressed enough. Policies for technology use, data security and management, communication and assessment procedures offer a concrete structure for the delivery of digital education. Clear and actionable policies remove some of the need for ad hoc decision making by teachers thus supporting them in offering a high quality of learning environment, rather than simply a digital environment. Regular review of policies by school staff is important.

Time management is an additional key area of practice in effective digital teaching. Specifically it is important that teachers are able to manage online resources and communications so as not to be overwhelmed. Systematic management including using templates, designated online communication times and a well-structured workflow can reduce risk. Teachers should identify time slots and work expected workload into this structure, ensuring that work/life balance is maintained [3; 4].

It is more natural for student autonomy to flourish within well structured digital learning environments. For example, students can use the space available to explore resources or learn at a pace that suits their needs and abilities. Through careful scaffolding and by offering students choices and different options for approaching tasks, and encouraging reflective practice teachers can give students ownership of their own learning experiences. This gradually develops student autonomy. This level of student autonomy must be accompanied by some element of teacher guidance however and in order to maximize convenient some students will need increased levels of assistance and differentiated choices.

The digital environment lends itself to the creation and execution of interdisciplinary work more readily. Two or more teachers from different subjects can create collaborative projects that use resources or integrate ideas across curriculum areas. Digital platforms make it possible to share workspaces even with other schools. This gives students the chance to make connections and understand how different bits of knowledge are interrelated within a more holistic piece of work. Technologies have made the sharing of information across distances a lot easier and simpler. Cooperative work and

divergent thinking is fostered when teachers from different subject areas co-teach.

The act of educating with a future perspective requires students to do more than simply learn how to operate technological tools; it demands that they consider the ways in which those tools influence contemporary society. The incorporation of discussions on automation, digital morality, security, the dangers and potential of online media, and developing a critical media literacy skills will provide context for the role of technology. Through active engagement of teachers with dialogue around how technology shapes forms of communication, work and social relationships, education will foster thoughtful use of new technologies in inclusive ways. Technological competence together with moral sensitivity can inform curriculum and prepare students for an evolving world.

While teachers are becoming more and more globally involved with the aid of modern technology, in this context students enjoy broader access to source of knowledge. With the use of online courses learners are enabled to communicate directly with other participants from round the world and, often, to joint other projects through virtual teamwork. Therefore, digital networking results in growth of intercultural knowledge, worldwide attitude and linguistic skills, which are of long-term value. Furthermore, those teachers who motivate the students to demonstrate understanding of the target culture and enhance their oral skills through web-based activities can contribute to learners' communicative competence within the society. Nevertheless, in order to ensure the success it is necessary to bear in mind the necessity to set clear objectives, preparations and plan of action as well as to identify possible problems.

In digital environments motivation is strongly linked to validity and appropriateness. Students stay motivated and attend when the use tasks are valid and authentic. The internet can be a rich source of up-to-date information and new tools at a professional level. Authentic audience and publishing students work results will carry over to a sense of ownership, motivation, and pride in achievement. Authentic assessment and use of tasks in authentic situations and with authentic audience boost intrinsic motivation and retention.

Differentiated and individualised feedback methods can be used. Automated quiz's give instant immediate feedback, audio or video can be integrated into assessment to humanise it and online marking by way of peer assessment and structured review allows cross fertilization and thinking. Technologies open endless communication channels between tutor and learner in a development assessment context.

Cybersecurity awareness is essential across all education facilities. Figure 3 illustrates that institutions would need to take steps toward securing all digital content they manage under authenticated logins to protect student's data with a high level of security. Lecturers and students must be made aware of how critical password security is to safeguard email systems and minimize the risk of cyber intrusions. Providing education and instructions would be most effective at reducing internal digital threats while discouraging external

manipulative predation. Two conditions for secure digital environments; institution morality and successful digital acquisition can be optimized.

Moving forward, the creation of new education technology will continue to require teachers to keep up. With every new technology come new possibilities for engagement, personalization, and automating the delivery of instruction. The difficulty will remain keeping focus on pedagogy and two Pillars: responsible use and ethical application. Teachers who work toward the focus on student learning goals rather than the latest shiny device will remain reflective and true. It requires ongoing discussion, ongoing education, and ongoing cooperation to progress responsibly. Digital education depends on humankind, design, and innovativeness working together to make learning more experiential.

But presence must stay alive on the digital campus. Although it is different through the lens, students still need to know they are seen, heard, understood, supported and appreciated by the instructor. Say hello, send a check-in note, give a cheer, shine a compliment, show interest, recognize effort, make me feel like a human being and make me part of a virtual community is user video campus tours, "standard" online hours, "administrative/teacher coffee breaks". When each of us as instructors appears, "at the other side" of cyberspace and when students know we really do care about the things for which we have expressed our care they will invest the time. They will get involved. They will persist.

Use of gamification in a meaningful way has the chance to boost motivation. Using such reinforcement as keeping a record of winning posts, prizing achievement through badges and integrating targeted challenges can act as motivation through established goal points and direction. However gamification should be directed toward the educational content. Excess external motivation or superficial reward could diminish internal motivation to achieve leaning outcomes. Teachers should find balance between attractive punter and precision apparatus to cultivate mastery. When approached with proper concern, gamification can produce curiosity and adherence to "fluffy" content.

And all digital content should be developed to accessibility guidelines. Readable and Accessible text, fonts with correct sizes and types, adequate contrast, description of images allow all students to receive course materials. All used media must be captioned or have transcript for students with hearing or other language programs. Everything should work with accessibility from the beginning of the design (Universal Design for Learning - providing multiple means of engagement and expression - includes all levels of learners 12%).

Teacher identity still appears as digital transformation develops. Teachers have transcended from knowledge transmitters to designers, enablers, mentors and resource curators of digital materials. Such progression allows teachers to keep pace with the dynamic technological changes. Consequently, the professional identity may be adjusted. Critical self reflection on those diminishing roles better guides professional focus and builds up the believers' confidence.

Finally, digital education has a future only if it will be integrated carefully and not technology-dependent. All tools will develop, not lessons. However, they will always follow the same principles: clear objectives, depth and on-task motivation, ethical attitude and deep interest to pupils' development. Only teachers with solid digital skills and a big concern to pedagogies will be able to adapt to new realities. Good digital teacher finds a good balance, for the benefit of pupils, and sustainable digital education exists.

Another means to benefit from outside organizations is to involve them in digital learning. In addition to comparing, universities, corporate companies and different regional organizations can be a supply of technology knowledge and working experience available for the class. Looks of external involvement range from guest seminars, teleconferencing with business people, to cooperative assignments. Inventive external cooperation benefits both educational scope and does provide instructors with information and common sense. Still, external cooperation should be integrated creatively into educational framework and observed with the decency reference when unlocking the outside world.

Sustainable issues are more relevant than ever when working in digital education. We must realize that using online devices like computers and supporting infrastructures—constructing, operating and discarding—has an impact on the environment. This can be addressed in digital education by encouraging responsible use, energy saving schemes and recycling. These all help to enlighten us about the environment more. By using digital education we can reduce paper consumption, enhance remote access and thus reduce transportation emissions. Teaching students about the ecological status can help to mainstream the ecological dimension into electronic literacy.

Official language of the digital galaxy preys ostensible advantages and disadvantages. There are some which favor digital language of students. They inclusive Internet-wide get right of entry to a variety of resources, employ of translation applications for reaching out across the brim, practicing language in has a face-to-face, real-world interactions with Foreign Languages (FL) understands, etc. There are those advantages of operating in the digital medium which are not crick in the favor of the students. However textual content-based correspondence often flies more s fortune when being aphoristic and terse. For students, who are not spelt out in regaling and elaboration, they would tend to compose uncomplete and ultimately unperspicacious responses ors comments. Teachers, nd therefore, need to conduciveness students with the technology for their good in maturing their language domination. They need to aisles the students with classical writing practice, persuasive writing, reading critically, forming an argumentative speech, and civilized interchange between cultures.

In this time of information at our fingertips, being able to think critically is crucial. Learners should know how to evaluate websites, recognize bias, and verify information through other sources. The openness of the internet provides unparalleled exposure to new perspectives but that doesn't mean all that information is reliable. Instructional providers must lead by example

and incorporate tasks that hone these evaluative skills. Tasks that incorporate source comparison, analysis of evidence, or “news” analysis develop these thinking skills. Developing the area of critical thinking better equips learners to navigate digital information thoughtfully.

Digital education should be evaluated on an ongoing basis so that the resources remain effective and on course. School communities (including teachers and students) should be profiled and evaluated at regular intervals to learn about their problems and successes with technology infusion. Pilot projects or phased roll-out can provide opportunities for preview and refinement. Think and plan hard about what the ultimate value of a sustained investment in digital education actually shall be. Consistent introspection will keep us focused and moving towards the outcomes we've expected.

The wellbeing of students is also important to digitally enriched learning. Extended time on screen, the restriction in physical activities and potential problem of inconsistent connection may potentially have an influence on health and concentrated focus, if not handled appropriately. Teachers will have to develop a teaching approach that finding a way to guide students through mixture of virtual and real work in a successful ways, encourage to be physically active, and use variety of teaching strategies. Encouraging to adopt healthy digital habits of practice will encourage positive learning behavior as well as develop time management skills and self-control in students. Clear separation of study and relax periods applies doubly to online education. Such support will benefit not only students' wellbeing, but also the efficiency of digital education.

Ethical leadership is essential to foster both effective digital transformation and to sustain open, trusting relationships within the school. School leaders should act as responsible role models by illustrating the proper use of technology, being transparent about the use of digital tools and setting clear, ethical standards concerning data privacy, intellectual property, and academic honesty. The inclusion of feedback from teachers, students, and parents, and the decision making based on the shared values can inspire more widespread digital competency and innovation in education.

Differentiated professional development. As teachers are working at different levels of digital competence professional development should be catered for these levels. For some elementary level professional development may be appropriate, while more experienced teachers can participate in more experimental workshops that focus on innovative developments or new. Guided personal learning paths improve effectiveness and motivation. Engagement through peer mentoring can be used to close the gaps by encouraging more established teachers to train those who are less experienced but interested. Ongoing availability of resources and learning communities is essential.

The involvement of local communities increased the effectiveness of education delivered via digital means. Businesses and civic institutions participate with areas of expertise and local knowledge. Consisting of the whole community in digital projects relates digital initiatives with the community. Public displays of student projects foster ties of education with society.

Being transparent about digital concerns creates mutual understanding and joint efforts.

Thus, as our educational systems move through some of the most profound advances that learning technology has produced, the bedrock principle will always be to adapt and improve upon unrelenting passion and a belief in meaningful learning. Changes in technology may come and go, but schools that embed reflective practice, build collaborative culture and foster ethical awareness will welcome the wisdom that allows the shock of change to cower in the face of their strength. Educators who adopt lifelong learning as their mind-set will be malleable toward emerging developments, yet firm in their foundation of good pedagogy, sound leadership and innovative vision. Together, all of the above will ensure that digital change sustains and reflects good practice and makes a difference.

Digital transparencies help establish a trusting relationship between teachers and students. When course policies and grading points, participation expectations, and technology requirements are transparently shared, students are less anxious about possible confusion and more able to devote energy to learning. Furthermore, digital transparencies afford opportunities to inform students as to the rationale behind the use of certain digital methods and tools. Student attitude toward a particular tool or approach can be improved when students see its relevance in the learning process. A relationship of transparency also helps keep expectations reasonable while fostering a sense that the course adjustments are collaborative and that the instructors respects students.

Ethnicity/class in digital education which is crucial in our much more multicultural classrooms. Online sites provide opportunities for students from different linguistic, cultural, and social histories to learn together. Educators might create lessons which include multiple voices, strengths, and perspectives or avoid stereotypes of cultures. Promote awareness of the impact of dialogue or interactions we form with others and the importance of deep, reflective discussion about issues. Digital societies allow students more space to use their voices.

The importance of skills of self-regulated learning is especially relevant in online learning contexts, as learners need to direct themselves more than ever before and independently set time goals, monitor their own progress and review their methods. Teachers can give students structured time frames, lists, timetables and reflection questions, in order to foster development of these skills. In addition, including instruction in ways to set goals and measure progress can give learners a greater sense of responsibility and independence. Offering planners, checklists and progress charts or diaries increases organized effort, which enhances self regulation. Developing these skills will improve learners' ability to adapt their self-regulated learning skills in other contexts.

Balance innovation with evidence-based evidence. As innovations are exciting, it should not be rushed without reviewing research and statistics for effectiveness with pilot studies and small scale trials while gathering statistical evidence to improve student

achievement and engagement. When appropriately researched and adopted, it will not put schools to unnecessary loops and wastes.

In summary: digital education must continuously evolve a combination of pedagogy, technology, leadership, ethical understanding and community involvement. No single aspect holds the key to future success. Only when all of these pieces come together can lasting progress be made. Ultimately, central to digital education are teachers as developing reflectors of practice integrating the many tools toward meaningful purposes for learners. With ongoing teamwork, ethical sensibility and focus on student welfare digital education can develop appropriately for the future. Ultimately, it is not technology that will define the future of learning but how all the elements come together.

A strategic use of investment in technology is also crucial in providing a quality digital learning experience. Technological investment should be regularly upgraded in terms of broadband access and equipment, and replaced rather than used for one-off purchases. Technical support is also an essential component to minimize downtime and supporting teachers and students. A solid infrastructure provides the platform from which digital experimentation and creativity can blossom.

Mentorship enhances confidence and professional growth in digital learning. Veteran teachers who have past successes with technology adoption can guide others, translating their hands-on knowledge into action for novices. The mentor-mentee dynamic cultivates an atmosphere of trust in which inquiries and methodologies are unjudged; continual mentoring conversations catalyze reflection and troubleshooting. Mentorship enhances patience, flattens the learning curve, dispels uncertainty and collaborative video photography grows into a community of shared strength.

Learners must be empowered to contribute to the development of technology-enabled learning. Direct input through questionnaires, focus groups and free commenting can ensure that learner positive and negative experiences are heard. Learners are most vocal about issues of interface, reliability and whether they feel that it inspires or inspires them to learn. Giving learners the sense that they are involved in making decisions will lead to increased acceptability and accountability on their part.

Flexibility represents a key strength of successful digital learning systems. An ever changing landscape with unpredictable interruptions, regulations and new technologies demands flexibility from educational institutions. Flexible schedules and modular curricula together with adaptable pedagogy facilitates transition for dynamic conditions. Educators can ensure learning skills by developing back-up strategies and applying alternative methodology.

Ultimately, the ongoing advancement of digital education is symbolic of the evolution of human life. As workspaces, communication outlets, and avenues of civic involvement are moving into digital environs, schools have an obligation to advance digital literacy within an ethical, collaborative, adaptable, and aware framework. Those committed to venturing into the digital realm with an appropriate sense of balance can

serve to cultivate powerful future human beings. Continually examining the interplay of humans and computers through reflective and collaborative exploration and intentional technological design will help digital education to flourish.

Assessment must be adapted thoughtfully for digital learning. Conventional testing strategies might not measure what students really understand in virtual or mixed contexts. Teachers need to establish testing strategies that assess analysis, synthesis, evaluation, problem-solving and experimentation, as well as creativity and ingenuity. Technology enables teachers to encourage experimentation, enable collaborative activities, provide instant feedback and make testing more dynamic. Using regular assessment components such as assignments, in-class exercises, project work, or portfolios, and not just endterm exams, offers a better idea about students' growth and learning. Reflective assessment practice also helps teachers to recognize their educational shortcomings and better help students in the future.

The presence of professional communities of practice is not limited to the physical space of the school. Online communities of practice exist to allow teachers to exchange resources, ideas and approaches across continents and countries. The experience of and participation in communities of practice lead to the development of innovative practices and the access to the most recent research and advances in learning and teaching. The importance of sharing resources and know-how between schools promotes equity and reduces inequalities to access to up-to-date practices.

Security and privacy issues are fundamental to digital education. It is not just legal; it is also moral to ensure that data about students is not accessed improperly or used maliciously. Data must be managed accurately and reliably, and teachers and institutions must ensure good practice, such as strong passwords, encrypted text by transmitting information, and seeking free, where relevant, for any data used. Support and advice should be provided to enable students to behave responsibly when online. If security and privacy is maintained then confidence in digital learning can be engendered.

Online motivation is effectively stimulated by features of the virtual environment. The incorporation of games, multimedia modules, and project work boost engagement levels and help maintain focus. Instruction that relates new knowledge to students' pre-existing interests or past experience as well as to its future practical application kindles intrinsic motivation. Giving frequent positive reinforcement for student participation in the form of evaluations or virtual achievement tokens sustains motivation. Motivated students buy into, and work harder at, the task at hand-- leading to better learning outcomes.

Sustainable supports in digital education reflect the long-term ongoing process rather than instant solutions. For institutions and organizations investing in the long term, issues regarding up-keeping the software licenses, hardware maintenance, cloud infrastructure, technical support, training for educators, and future upgrades, must be considered. Like any other learning tools, digital innovations benefits for ever if teachers

and learners show motivation and capacity to share the responsibility, make use of the available resources, the relevant digital support tools should be sustainable. In order to maximize the value of any investment in digital resources, and ensure continued development and usage, its benefits need to be regularly reviewed to evaluate its effectiveness in the light of pedagogical goals, and for meeting the needs of learners.

Ethical concerns in digital teaching are becoming more debated. Teachers now have to think about deal with questions of equity, access, cheating and pedagogical and ethical use of information technology and artificial intelligence. Digital learning platforms and environments can actually magnify inequalities if some students do not have the same levels of access and support. Teachers have a moral obligation to provide equal learning opportunities and designing inclusive activities and contents. They also have a duty to develop students' ability to think critically and ethically about certain digital actions. Ethics should be incorporated in digital teaching so that learners have a good learning experience and become ethical digital citizens.

Leadership is an important facilitator for digital transformation. School leaders provides leadership, set the change process, make resources available and models desired behavior. School leaders establish the climate of change, and this gives schools room to experiment, cooperate, support teachers learning and develop professional learning communities. The school leader that effectively leads the digital change involves a visible and acting presence that remove barriers, argues for infrastructure and is attentive to the alignment of policy and pedagogy with the use of technology.

When teachers engage in digital learning with their students, the school community comes into play and can enrich the learning process. Family involvement and the use of community members and local businesses can serve educational program needs. Home school connection can help to create a common student experience at home and motivate students toward learning. Consultants from outside the school, can be used to demonstrate application of content learning to students. Technology facilitates communication and coordination between the school and community. Learning can be made more real and relevant when schools have community involvement.

In conclusion, for high quality digital education to be realized, there is a need for technology expertise, pedagogical knowledge, ethical consideration, leadership, and community involvement. Teachers are the key to integrating these various needs by integrating them in the pedagogical use of technology within learning activities. To improve the quality of online learning the teachers should receive more support and opportunities to gain knowledge, collaborate with their colleagues and peers, promote positive practice, and focus on the student, the equality and the sustainability of the digital education. An investment on the infrastructure, the motivation, the assessment and the ethical dimension of the school, can lead to learning spaces where the student can learn more and where the teacher is empowered and engaged in a digitalized world. We can thus move forward towards sustainable and valuable learning experiences that satisfy the need of every student in

digital space expanding its meaning towards positive practice and human values.

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