

Bridging the Digital Divide: Organisational Digital Competencies in Science and Art Centers[✉]

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Abstract

In Türkiye, Science and Art Centers (BİLSEM) enhance digital literacy and cultivate the unique talents of gifted students, selected based on exceptional qualities. BİLSEMs are dedicated educational centers focused on enhancing the learning journeys of talented students in the arts and sciences through technology-driven, individualized programs that complement formal education. It is crucial to examine digital competencies and the digital divide relating to these institutions. Researchers observe discrepancies in permanent teacher employment and the availability of technical equipment across BİLSEMs. This inconsistency creates disparities in establishing technology-integrated learning environments. Literature has limited studies on BİLSEMs. It links the digital divide and competencies with a notable absence of studies integrating organisational digital competencies and technology leadership characteristics within specialized educational institutions.

In response to this challenge, this project funded by the Scientific and Technological Research Council of Turkey (TUBITAK), titled “The Impact of Digital Competencies for Mitigating the Digital Gap: School Principals’ Technology Leadership Competencies and Organisations’ Digital Competencies in Science and Art Centers,” runs from 2024-2026. The project team includes practitioners and academics representing the first phase of our research. After completion, we aim to engage in international projects on additional dimensions from literature, like teacher competencies and course content production, collaborating with the existing team and forming new partnerships to cultivate citizens with digital competencies.

This project clarifies the technology leadership competencies of BİLSEMs’ principals and their organisations’ digital competencies through exploratory research. Due to the lack of findings in existing literature, a critical assessment of this research’s results is not possible. A mixed-methods approach involves interviewing principals from selected BİLSEMs to evaluate their digital capabilities. Data will be analyzed through phenomenological inquiry and analytical comparison. Furthermore, principals’ technology leadership competencies will be assessed using quantitative scales from teachers. Data collection for both parts will be conducted independently. As an output, a policy brief will address the digital divide in BİLSEMs, focusing on differences in digital competencies and leadership.

The portion slated for presentation at this conference will discover the reflections of the interviews conducted with ten (10) principals from BİLSEMs about their institutions’ organisational digital competencies within the framework of our integrated project. Methodologically, phenomenological inquiry was conducted. Four key elements concerning the digital divide, particularly within the Turkish context, have been considered: First, campaigns aimed at supporting access to technological devices and providing opportunities for open access to software. Second, government support for disadvantaged groups, particularly concerning digital inclusiveness and access to technology. Third, promoting inclusion regarding access and participation in digital services, specifically within public service sectors. Fourth, the assurance of effective and appropriate usage of digital services.

An analytical comparison approach was employed to interpret data, performed using the licensed version of MaxQDA 2024. In line with the nature of the approach, the content analysis method was executed to interpret the data.

This study will provide a partial evaluation and open a new avenue for comprehensive discussion. It will clarify the underlying factors causing the digital divide and the organisational digital competency challenges faced by BİLSEMs.

Keywords

Digital gap, organisational digital competencies, science and technology policy, science and art centers ¹

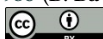
*EGOV-CeDEM-ePart conference, August 31 – September 4, 2025, University for Continuing Education, Krems, Austria.

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1. Introduction: Context and Novelty

Advancements in digital technologies have fundamentally transformed public services, necessitating the extensive adoption of these technologies by local and global policymakers. The emergence of e-government has mandated the development of digital competencies among citizens, presenting considerable challenges in public education initiatives [1, 2]. Access to and utilization of Information and Communication Technologies (ICT) vary significantly across social and demographic factors, which are critical considerations for training both public administrators and citizens [3]. It is crucial to develop and continually update digital competence profiles for educators, as well as to enhance educational environments, thereby fostering improved digital skills education at all educational levels.

The digital divide is a multifaceted issue that encompasses various dimensions—ranging from access to skills, usage, and outcomes—shaped by social, economic, and infrastructural factors [4]; [5]. This project has evolved from a primary focus on access disparities to examining the wider implications of digital inequality on institutions. Digital competency encompasses the skills, knowledge, and attitudes necessary for the effective use of digital technologies across workplaces, educational environments, and vocational settings [6, 7]. The project underscores the significance of digital skills and proficiency at both managerial and institutional levels.

The literature identifies two predominant frameworks: (a) individual digital competence and (b) organisational digital competence, sourced from various international institutions [8, 9, 10, 11]. Technological leadership exhibited by institutional managers significantly influences the effective integration of technology within educational contexts [12]. Research indicates a clear correlation between the digital divide and digital competencies [13, 14].

The connection between e-government, digital competency, and the digital divide is important, underscoring the requirement for digital skills in government initiatives. The findings indicate that Digital transformation is essential for public sector reforms [15], and improving digital skills is crucial for citizen participation [16]. However, significant divides in access to digital technology reveal a resource gap between larger and smaller administrations. Digital competency enhances service delivery and citizen engagement, but a skills gap exists between citizens and public workers, particularly in rural areas. In these conditions, Targeted capacity-building programs are crucial for equitable access to services [17].

The digital skills of civil servants significantly impact the quality of services, necessitating investments in their competencies [18, 19]. Digitalization plays a crucial role in education, with [20] emphasizing its importance in school administration [21] as well as underlines the necessity of developing the skills and leadership of civil servants for effective digital adoption. The National Educational Technology Plan (NETP) advocates for strategic leadership to promote digital integration, highlighting the importance of organisational digital competency among educators and administrators. Effective leadership aligns digital initiatives with organisational goals and ensures that staff are adequately skilled [22]. A robust digital culture enhances employee performance, illustrating how leadership can contribute to the advancement of skills in the public sector [23].

In Türkiye, the Science and Art Centers (BİLSEM) are institutions designed to enhance digital literacy and nurture the unique abilities of gifted and talented students, selected according to specific criteria that reflect their traits. BİLSEMs serve as specialized educational establishments focused on enriching the learning experiences of talented students in both the sciences and the arts. Education is provided with an individualized learning program planned outside of formal education. Therefore, it is essential to explore issues related to digital competencies and the digital divide as they specifically relate to these institutions. [24]. However, disparities in teacher

employment and the availability of technological resources precipitate inequalities in technology integration across BİLSEMs.

Literature reviews reveal a scarcity of studies focusing on BİLSEMs, with most research centered on the perspectives of teachers, students, and administrators [25, 26, 27, 28], the learning performance of BİLSEM students [29, 30, 31] and the specific needs of gifted students [32, 33]; [34, 35]. Furthermore, studies have established connections between digital competencies and the digital divide through the lens of digital literacy [36, 37], as well as exploring its interplay with digital competencies [1, 38]. Nonetheless, there remains a significant research gap concerning educational institutions that integrate organisational digital competencies with the technology leadership exercised by their administrators.

The researchers note inconsistencies in the number of permanent teachers and technical resources across BİLSEMs, affecting their ability to implement tech-enabled learning. Literature on Science and Art centers is scarce, and studies linking the digital divide to digital competencies often overlook how organisational digital skills integrate with leadership traits in specialized educational institutions.

To address the gap in existing literature, this project examines reasons for differences noted by researchers, especially disparities among BİLSEM institutions in developing technology-integrated environments and the relationship between digital competencies and the digital divide. The project aims to investigate the relationship between the technology leadership characteristics of administrators [39, 40] within BİLSEM institutions and the institutional-level characteristics of the organisations in which they operate [41]. Furthermore, it seeks to assess the organisational digital competency levels of BİLSEM institutions [42, 43] as understanding these dynamics is critical for mitigating the digital gap among BİLSEM institutions, prioritizing technology-enhanced education.

The methodological innovation of the project is articulated as follows: The project employs an exploratory design employing a "Parallel mixed method" approach to evaluate the impact of digital competencies on bridging the digital divide. Given the limited existing literature, a comprehensive assessment of results is not feasible. The applied research during the data integration phase concentrates on specific issues, gathering data from primary sources through field and survey research [44].

In the qualitative component, assessments have been made regarding the digital competence levels of the institutions presided over by the principals. The literature review revealed a lack of quantitative scales that concurrently measure technology integration and organisational digital competence within educational institutions. Therefore, various organisational digital competence frameworks designed for educational settings were scrutinized, and a semi-structured interview questionnaire featuring open-ended inquiries was formulated based on the stages outlined in the organisational digital competence frameworks [42, 43].

The selected frameworks are combined with key themes regarding practical approaches to addressing the digital divide, particularly in Turkey [45]. Using the digital competency framework for educational organisations, along with the framework focused on factors that mitigate the digital divide, facilitates a comprehensive assessment of BİLSEM institutions' digital competencies and their role in bridging this divide. This conference presentation will share insights gathered from interviews with ten BİLSEM principals concerning their institutions' digital competencies within our integrated project. It will discover the reflections of the interviews conducted with ten (10) principals from BİLSEMs about their institutions' organisational digital competencies within the framework of our integrated project.

Methodologically, this part adopts an inductive phenomenological inquiry in qualitative research methods.

2. Research Design and Method

The section designated for presentation at this conference will delve into the insights gleaned from interviews conducted with ten (10) principals from BİLSEMs regarding their institutions' organisational digital competencies, framed within the context of our integrated project. The methodology of sampling employed in the project can be articulated as follows:

The universe includes Science and Art Centers in Türkiye. The project sample features elements relevant to the research. Due to limited time and resources, the goal is to find a representative sample from the population. This sample targets explicitly BİLSEMs established before the COVID-19 pandemic. The pandemic hindered BİLSEMs' effectiveness, causing technical and administrative issues. Although many BİLSEMs have been launched post-pandemic due to the MEB education strategy, they currently lack sufficient teachers, students, and infrastructure, which is expected to improve. Thus, the sample was narrowed to 184 BİLSEMs established before 2021. The selection used a multi-stage sampling technique to explore the leadership and digital competencies of BİLSEM managers across 184 BİLSEMs. Initially, purposive sampling narrowed the sample from 184 to 85 using four criteria: 1. At least 20 students per level per MEB BİLSEM directive. 2. A permanent principal and two assistant principals. 3. Past participation in a TÜBİTAK regional exhibition final. 4. Engagement in TÜBİTAK Science and Society Projects.

A stratified sampling method divided samples into 12 regions per TÜBİTAK's framework to improve representativeness. Then, 24 BİLSEMs were randomly selected based on regional institution counts, prioritizing higher concentrations. Two provinces from each region were chosen, excluding Istanbul and Ankara, considering accessibility and disaster recovery, totaling 20 provinces. This ensured balanced regional representation.

To assess the digital competence of organisations within BİLSEM institutions, researchers will use an interview protocol aligned with qualitative, phenomenological approaches. This method aims to uncover realities by exploring individuals' interpretations based on their lived experiences. The study seeks to describe the organisational digital skills in BİLSEM institutions in Türkiye through an inductive phenomenological framework. Initially, the researchers examined observations and influential factors related to the digital divide in Turkey,[32] including four components described in [45]. These include: campaigns promoting access to devices and open-source software; government support for marginalized populations; fostering access to and engagement with digital services; and ensuring proper use of digital services. Then, two distinct frameworks for organisational digital competence [42, 43] were adopted as thematic focus points to explore BİLSEM's organisational digital skills, providing insights and perceptions regarding the principles of specific BİLSEM institutions.

The fundamental principle of phenomenological research is that truth is accessible through experience. Here, individuals serve as data sources, with their experiences as data [46]. BİLSEMs' principals, as technology leaders and data sources, align with the phenomenological pattern and research focus, sharing experiences and observations. The interview form was based on categories from digital competence frameworks in [42, 43]. The interview is particularly suitable as it resonates with the nature of phenomenological inquiry. The interviews will proceed face-to-face with approximately 24 BİLSEM directors, utilizing a one-on-one interview technique. The segment designated for presentation at the conference will examine the insights garnered from interviews with ten (10) principals from BİLSEMs regarding their institutions' organisational digital competencies within the context of this integrated project. The research data will be categorized by attributes and analyzed using MAXQDA 2024 for semi-structured interviews. The

qualitative analysis method is analytical comparison analysis, which identifies commonalities among situations with similar outcomes [47]. The method is detailed as follows:

BİLSEMs within the research sample will be classified based on their establishment years. Notably, the 2007 BİLSEM directive introduced new criteria for teacher selection to enhance qualifications [11]. Hence, the classification will distinguish between BİLSEMs established prior to 2008 and post-2008. Furthermore, concerning the level of digitalization within BİLSEMs, the mean values of numerical criteria delineated specifically, 1) the number of accessible computers, 2) the number of 3D printers available, and 3) the number of smart boards in use—has been utilized for data aggregation. [28]

A subsequent categorization was conducted based on each BİLSEM's average relative to the overall mean, resulting in a four-category framework: (1) high digitalization BİLSEMs established in 2008 or earlier, (2) low digitalization BİLSEMs established in 2008 or earlier, (3) high digitalization BİLSEMs established after 2008, and (4) low digitalization BİLSEMs established after 2008. The final analysis will compare interview data within this schema (see **Appendices A**). This approach provides the space to investigate the factors underlying the digital divide in BİLSEM institutions and the role of organisational digital competencies in mitigating this disparity.

3. Preliminary Results

Four key dimensions concerning the digital divide, particularly within the Turkish context, have been considered in the interview stage. 1. Campaigns aimed at supporting access to technological devices and providing opportunities for open access to software. 2. Government support for disadvantaged groups, particularly concerning digital inclusiveness and access to technology. 3. promoting inclusion regarding access and participation in digital services, specifically within public service sectors. 4. the assurance of effective and appropriate usage of digital services [45].

Institutions with a high ratio of devices to students, established prior to 2008, are categorized as IST-2 and Balıkesir. The findings related to IST-2 are as follows: “Our district boasts a strong socio-economic status. Generally, students utilize the institution's devices, although some may opt to use their devices instead. Istanbul is abundant in digital technology investment firms and network operators, which allows for numerous collaboration opportunities and partnerships; some of these involve our own students' parents “(dimension 1).

“Our Ministry actively supports open-source software like Pardus. As you know, any software and educational materials must receive Ministry approval. We incorporate software deemed suitable by our Ministry” (dimension 3). “Given our district's affluent socio-economic background, we do not have any students from economically disadvantaged families. Should we identify any such students, we are prepared to offer support within our institution's capabilities” (dimension 2).

“We uphold a strong commitment to software copyright compliance, ensuring that all our software is appropriately licensed, as we are a public institution. If we discover students using unlicensed software, we initiate the necessary procedures, as there are significant penalties for such usage. Most licensed software is produced by foreign companies, thus requiring caution in our approach as an institution. As an institution manager with a doctorate, I have observed similar practices abroad and believe that implementing a comprehensive institutional technology plan is imperative for Turkey” (dimension 4). The findings related to Balıkesir are as follows: “We discuss various workshop opportunities and use the MEDI application with national education platforms. Course content develops through collaboration between students and teachers, considering individual abilities. Programs include outdoor lessons through camps” (dimension 3).

“Calibration may be necessary for devices used by visually impaired students, and we receive technical support for this” (dimension 1). “We have built an infrastructure for disadvantaged students with over 90% vision loss, ensuring relevant information synchronizes with their tablets. We have collaborated here and with the institution where the student receives formal education, incurring approximately 100,000 in expenses with Ministry support. We utilize family networks and institutional resources for students on our risk map with low socio-economic backgrounds” (dimension 2).

“We procured ten Minecraft licenses for our students, supported by family networks. We diligently obtain licenses and stress their significance, issuing warnings to both teachers and students. As an educational institution, we are dedicated to continuous improvement. A thorough technology plan is crucial. It should detail present opportunities, create forecasts, set future goals, and define objectives for enhancement. Moreover, we strive to improve the technological skills within our community” (dimension 4).

Institutions with a high rate of devices per student established after 2008 include İzmir and Mardin (See **Appendices A**). Key issues from the interview in İzmir include: “Students create online environments using VR glasses to access international museums. They engaged with VR during their recent project. We leverage governmental support for our educational efforts” (dimension 1). “The curriculum is independent. No support measures are in place due to the absence of disadvantaged students. Institutional support is available from 8:00 to 9:00 PM. Students can access labs and classrooms, but no additional services are offered” (dimension 2-dimension 3). Licenses from device purchases are available to students and teachers, with IT educators being the primary users. Without dedicated IT instructors, teacher utilization is limited, preventing the use of open-source software like Pardus” (dimension 4).

The key findings from the interview conducted in Mardin are as follows: “This is a small city. The use of an artificial intelligence-supported learning environment among IT teachers is limited by our internet infrastructure” (dimension 3). “Accessing support or software campaigns is challenging here. There are only a few companies available for technical assistance, and we are working with them to address these issues” (dimension 1). “I cannot comment on software as we do not have a budget for it” (dimension 4). “We do not have any initiatives aimed at supporting disadvantaged students. We rely solely on the resources provided by the state, and there are very few students in any case” (dimension 2).

Institutions with a low ratio of devices per student, established prior to 2008, are categorized as Ankara, İST-1, and Konya. The prominent issues in the interview conducted in Ankara are as follows: We do not actively utilize artificial intelligence tools for learning. We mainly use web tools for communication in student projects. Our institution's outdated devices do not align with the latest advancements in technology. The TL/Dollar balance limits our access to better technology. The age of our institution is reflected in our equipment. We use the EBA platform for online learning and have a limited number of virtual reality glasses that are used sparingly (dimension 1). Hyperactive and talented students support their disadvantaged peers. Ankara is a neighborhood of significant wealth. (dimension 2) We are a BİLSEM with inadequate infrastructure. Technological investments should consider the available space and environment, requiring substantial materials and alternative designs. (dimension 3) Our outdated equipment necessitates updating licenses. We must develop new undergraduate programs and create a comprehensive technology plan to enhance our institutional capacity (dimension 4).

The significant issues identified during the interview conducted in İST-1 are as follows: “At present, all training sessions are conducted in person. One of our parents was employed at Microsoft and aided us during the pandemic” (dimension 1). “Laboratories, resources, and experimental materials are utilized. We do not possess a simulator; however, we utilize virtual

reality (VR) glasses. I requested their support for the newly established BİLSEMs as we are a longstanding institution” (dimension 3). “We identify individuals in need and help. Parental sponsorship is a key resource. Last year, we provided aid to three individuals. Furthermore, parents exhibit notable generosity regarding donations” (dimension 2). “We encounter no issues concerning licensing, as we do not purchase licenses. The smart boards utilized are Pardus, and we employ software made available by the Ministry of National Education. Appropriate warnings are issued concerning copyright infringement. I do not consider a technology plan to be necessary” (dimension 4).

The key findings from the interview conducted in Konya are as follows: “My information technologies teacher, face recognition systems and algorithms are working. There is no paid purchase from teachers. Our infrastructure is low. There is no interactive board in every classroom. It is provided with copper cable and ADSL. There is no fiber infrastructure. This is a serious obstacle. We offer workshops in airplane design, digital design, informatics, and language, as well as laboratories established with parental support. We get our glider from a district” (dimension 1). “We do not have an Active online program. We hold administrative meetings with Zoom. Teknofest software lessons are held. We do not charge a fee for purchase. They sometimes take lessons with physics students in California state” (dimension 3). “We support students with disabilities and low socioeconomic status. We provide access to the school. We have created summer schools” (dimension 2). “We use the software that comes pre-installed on the computers we purchase. There is open-source code software. Our teachers use open-source or limited licenses” (dimension 4).

Institutions with a low ratio of devices per student and established posts prior to 2008 are classified as Mersin, IST -3, and IST -4. The primary issues identified in the interview conducted in Mersin include the following: “We lack a sound recording studio and have no technological devices aside from computers” (dimension 1). “BİLSEMs are recognized as the leading institutions in distance education. During the pandemic, we had a teacher who designed activities in the Minecraft universe, enabling students to create their games. This initiative continued afterward, and digital game competitions played a significant role. The provincial and national education initiatives are important here” (dimension 3). “BİLSEMs provide a space for disadvantaged students to relax and thrive. Quick learners find support here without needing additional resources” (dimension 2). “I believe a technology plan is necessary, potentially facilitated through the ministry” (dimension 4).

The interview conducted at IST-3 revealed the following: “We are well-equipped in terms of technology and have strong parental support” (dimension 1). “We acquire professional software as much as our institution’s resources allow” (dimension 3). “While we do not have any disadvantaged students, we do conduct technology projects for individuals with disabilities” (dimension 2). “As an institution, we endorse licensed software and open-source solutions. A technology plan is certainly worth considering, although it will require time to implement” (dimension 4).

Finally, the interview conducted at IST-4 revealed the following: “Our institution is recognized as one of those utilizing technology at a high level. It would be advisable to interview teachers specializing in technology and computer sciences” (dimension 1). “We do not have any students classified as being from disadvantaged groups. If deemed necessary, appropriate measures are taken” (dimension 2). “Are you referring to patent utility models in the context of licensing rights? My knowledge of this subject is limited. It would be prudent to consult technology educators” (dimension 4). “We provide a comprehensive range of learning environments for students, which includes research projects, utility models, and brand registrations” (dimension 3).

“I am uncertain whether a technology plan exists in Turkey. If such a plan were in place, we would undoubtedly implement it” (dimension 4).

4. Discussion and Conclusion

In the context of this project, a semi-structured interview protocol was formulated, drawing upon the stages delineated in the Organisational Digital Competence frameworks proposed in [29, 30]. This protocol aims to assess the digital competence status of BİLSEMs. The comprehensive average of the establishment years of BİLSEMs, along with the quantitative criteria established [28]—which include (1) the number of accessible computers in the institution, (2) the number of 3D printers available for institutional use, and (3) the number of smart boards in use—was calculated. Then, the rate of digital devices per student for each BİLSEM has been calculated. Subsequently, a secondary categorization was conducted based on whether the calculated average value for each BİLSEM met or exceeded the overall value determined by the criteria (See **Appendices A**).

The analysis of ten BİLSEMs revealed that five, founded before 2008, and five, founded after 2008, were examined. Mardin (0.19; 0.08) and İzmir (0.11; 0.08), which were founded post-2008, demonstrate high device rates. Similarly, İST-2 (0.10; 0.08) and Balıkesir (0.15; 0.08), founded in or prior to 2008, also present elevated rates. Conversely, Ankara (0.05; 0.08), İST-1 (0.06; 0.08), and Konya (0.07; 0.08), founded before 2008, display lower device rates. Additionally, Mersin (0.06; 0.08), İST-3 (0.07; 0.08), and İST-4 (0.07; 0.08), established after 2008, likewise demonstrate lower rates.

General findings on current interview data and comparison findings: The analysis of interview data and comparative findings is still in progress. The literature on strategies to reduce the digital divide in Türkiye [45] reveals significant variations in institutional support and the availability of digital learning tools, specifically in "Provision of Open Access Opportunities to Technological Device Support Campaigns and Software," (dimension 1) which largely depends on the institutional interest in technology. There was an apparent lack of responses concerning open-source software and copyright issues. In the category of "Support for Disadvantaged Groups in Digital Inclusivity and Access" (dimension 2), only a few projects were aimed at individuals with special needs, underscoring a notable gap in tangible institutional support attributed to socio-economic disparities and access challenges.

Concerning ensuring inclusiveness in access and participation in digital educational services within public service sectors" (dimension 3), it is noted that the curriculum implemented in BİLSEM institutions adopts personalized frameworks tailored to the unique abilities and requirements of exceptionally talented students. "Ensuring effective and appropriate utilization of digital services" (dimension 4) encompasses various subcategories. Predominantly, inquiries about copyright matters and technology planning garnered significant attention from interview respondents. A significant point to note in this area is the shortage of dedicated technology support personnel and the lack of a specific budget allocated for tech-related requirements. The analytical comparison of the interviews has yet to be conducted.

However, a preliminary evaluation indicates notable differences in the approaches and knowledge levels of institutional managers regarding "technological device support campaigns and open access" (dimension 1). There is limited information regarding copyright and open-source issues. Disadvantaged groups-oriented projects and individuals with special needs fall under the "inclusiveness and access" (dimension 2), but they currently lack specific measures to enhance educational experiences. The personalized education program is crucial for facilitating access to digital services (dimension 3) and may provide valuable insights into curriculum outcomes and the impact on access. Effective utilization of digital services (dimension 4), along with strategic

technology planning and awareness of copyright issues, is critical. The forthcoming comparison based on the analytical matrix should illuminate these insights. Ensuring data integrity contributes to a more meaningful assessment. The forthcoming comparison based on the analytical matrix should illuminate these insights. Ensuring data integrity contributes to a more meaningful assessment.

Acknowledgements

*“This study was supported by Scientific and Technological Research Council of Turkey (TUBITAK) under the Grant Number 223K219. The authors thank TUBITAK for their support”.

** We inform you that data permissions were approved by Istanbul University's Social and Human Sciences Ethics Committee in meeting 10 on 30/10/2023. All ethical considerations were addressed. This Word template was created by Tiago Prince Sales (University of Twente, NL) in collaboration with Manfred Jeusfeld (University of Skövde, SE). It is derived from the template designed by Aleksandr Ometov (Tampere University of Applied Sciences, FI). The template is made available under a Creative Commons License Attribution-ShareAlike 4.0 International (CC BY-SA 4.0).

Declaration on Generative AI

During the preparation of this work, the author(s) used specific formatting guidelines required by EGOV-CeDEM-ePart Conference. MAXQDA version 2024 licensed software used for data analysis. After using these tool(s)/service(s), the author(s) reviewed and edited the content as needed and take(s) full responsibility for the publication's content.

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Appendices A.:The Level of Accessible Digital Devices per Student of BİLSEMs: Matrix for Analytical Comparison

items	A-1	İST1	Konya	İST2	Balıkesir	İST3	İST4-	Mardin	Mersin	İzmir
Foundation year	1995	1996	2006	2008	2008	2013	2015	2015	2010	2011
Student numbers	1414	1500	1500	932	793	1300	1095	271	1300	600
3D printer	3	5	4	8	4	8	5	6	1	6
Computer	55	50	96	63	80	47	50	28	72	48
Smart Board	22	36	9	26	36	43	26	19	14	16
Total device numbers	80	91	109	97	120	98	81	53	87	70
Device per student	0,05	0,06	0,07	0,10	0,15	0,07	0,07	0,19	0,06	0,11
Average value	0,0827									
	The score of 0,08 and below indicates a low level of digital devices per student."									
	A score of 0,08 above indicates a high level of digital devices per student.									
	Digital device per student Levels: Analytical Comparison Matrix for BİLSEMS									
High level						Low level				
2008 and prior	İST-2					Ankara				
	Balıkesir					İST-1				
	-					Konya				
Post-2008	İzmir					Mersin				
	Mardin					İST-3				
	-					İST-4				
	*The grouping above has been formulated for ten (10) BİLSEM. As additional data is incorporated, the average value determining the extent of digitalization will undergo modifications. Consequently, this grouping will be revised accordingly.									