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University Leaders' Awareness of Inclusive Learning Environment through Technology Integration for Students with Disabilities: Jimma University in Focus

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Abstract

The main purpose of this study is to investigate university leaders' knowledge and awareness of creating an inclusive learning environment through technological integration for SWDs at Jimma University. The study employed a mixed research design (QUAN → qual) with an explanatory sequential design. Comprehensive and purposive sampling techniques were used to select 71 study participants such as 33 department heads, 5 team leaders, 6 coordinators, 6 college deans, and 21 directors. The key findings revealed that there is a low level of understanding of leaders. The correlation result between leaders' understanding and creating inclusive learning environment was (0.838**). This result suggested that there is a strong positive correlation. The p-value is <0.01, which means that it is statistically significant. Moreover, the result of multiple regression (p=.00) proved that the predictor and residence variable had a strong relationship. Furthermore, training, sharing experience, and collaboration with SWD services of accessibility are the strategies adopted to enhance leaders' knowledge and awareness. Finally, it is recommended that all university leaders work in collaboration with disability support services to create an inclusive learning environment for SWDs by integrating technology.

Keywords: creating inclusive learning environment, leaders' awareness, leaders' knowledge, students with disabilities, technology integration, university leaders.

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1. Introduction

1.1. Background of the Study

Technology has great potential for students in terms of providing access to all learning. In particular, assistive technology is a broad concept that covers virtually all things that may be used to meet the needs of those with a lack of certain abilities (Grönlund, Lim & Larsson, 2018). According to UNICEF's (2021) estimation, 90% of children with disabilities in low-income countries have never attended any educational institution, and those who do enroll often face higher dropout rates compared to their peers without disabilities. For instance, Canada has implemented various assistive technologies and digital tools in classrooms to support students with disabilities. In Africa, a significant number of SWDs face barriers to accessing education, including inadequate resources and lack of support (Makoe, 2016). Kassa, B., Getahun, T., & Yigzaw, A. (2014) found that while e-learning in Ethiopian higher education presents opportunities for expanded access and flexibility, its implementation is hindered by challenges such as limited digital infrastructure, insufficient faculty training, and low internet penetration. Getachew & Zewdu (2019) likely found that while Ethiopian universities are making efforts to integrate technology into higher education, progress is hindered by infrastructure limitations, lack of digital literacy among faculty, and inadequate institutional support for effective implementation. Let me know if you need a verified summary.

In Ethiopia context, a country striving to improve its education system and has also recognized the importance of inclusive education. By integrating these perspectives, institutions can foster a more inclusive and contextually grounded approach to utilizing technology, thereby addressing diverse educational needs (Bekele, 2023). The Higher Education Proclamation No.650/2009 article 40 of the Federal Democratic Republic of Ethiopia mandates that institutions of higher education make their facilities and programs accessible to physically challenged students as much as possible. Ethiopia's Higher Education Proclamation No. 650/2009 sets a strong legal foundation for inclusive education, but effective implementation remains a challenge. By leveraging the SAMR model and UDL framework, universities can transform learning environments, ensuring SWDs not only access education but thrive within it.

This approach underscores the theoretical and practical relevance of integrating assistive technologies into Ethiopian higher education, aligning policy mandates with global best practices in inclusive learning. The design of buildings, campus landscapes, computers, and other

infrastructures must also consider the interests of these students. Additionally, institutions must provide academic assistance, such as tutorial sessions, exam time extensions, and deadline extensions, to physically challenged students when necessary and feasible (Federal Negarit Gazeta, 2009). However, this research aims to provide valuable insights into the current state of technology integration in Ethiopian higher education institutions and to suggest strategies for improving the accessibility and inclusion of SWDs. Thus, the researcher focused on university leaders' understanding on creating an inclusive learning environment through technological integration for students with disabilities, with Jimma University as the focal point.

1.2. Statement of the Problem

Providing comprehensive support services positively impacts student retention, graduation rates, and overall satisfaction with the institution (Cabrera, Nora, Terenzini, Pascarella & Hagedorn, 2014). The use of assistive technology, such as speech recognition software or electronic textbooks, can significantly improve the academic performance and independence of SWDs (Okolo & Diedrich, 2014). SWDs are still underrepresented in post-secondary education, although inclusive higher education can support them in maintaining their entitlement to an education (Zhang, Rosen, Cheng & Li, 2018). Moreover, Zhang, Reber, & Benz (2016) faculty personal beliefs have the most direct influence on the provision of reasonable accommodations; knowledge of legal responsibilities and perceived institutional support directly influence personal beliefs. As Mohammed (2023) revealed, there is a low extent of technological integration at Ambo University. Therefore, as far as the researcher has been reading, there is still gaps related to this study but most of these studies address the potential of technology. However, Mohammed conducted a research mainly focused on the academic roles on creating inclusive learning environment. However, the current study attempted to show the knowledge, awareness and practices of university leaders on creating inclusive learning environment through technological integration for SWDs.

At Jimma University SWDs, including those who are hard-of-hearing, partially sighted, or physically disabled, face significant challenges, leading many to drop out due to unmet needs. As researcher pre-observations revealed issues such as university administrators' lack of trainings, inadequate inclusive learning environments, poor teaching strategies, inaccessible classroom arrangements, and limited resources. These barriers, both physical and attitudinal, inspired the researcher to study this issue, having observed these challenges since 2013 E.C.

The situation highlights the critical role of university leaders in ensuring inclusion, prompting the need for this research.

1.3. Research Questions

This research aimed to answer the following research questions:

1) What is the current awareness level of university leaders regarding the creation of an inclusive learning environment for SWDs through technology integration?
2) What is the relationship between leaders' knowledge and their awareness of creating an inclusive learning environment through technology integration for SWDs?
3) To what extent are university leaders aware of assistive technology and its integration for SWDs?
4) What strategies can university leaders adopt to enhance their knowledge of creating an inclusive learning environment for SWDs through technology integration?

1.4. Theoretical and Conceptual Framework

The range of necessary creativity is therefore at risk of being significantly influenced by the evolution of technology (Opdebeeck, 2017). Moreover, the Substitution, Augmentation, Modification, and Redefinition (SAMR) model provides a framework for understanding the levels of technology integration in education. When creating an inclusive learning environment through technology integration for SWDs, university leaders can use this model to guide their decision-making process. At the Modification level, technology is used to restructure learning tasks, making them more interactive and personalized for SWDs. In Ethiopia, digitized and accessible learning materials, the schools can develop text-to-speech (TTS) and speech-to-text (STT) tools in Amharic and other local languages to support students with visual and hearing impairments. Collaborative Learning Platforms, tools like Google Classroom, Moodle, or locally developed e-learning platforms can allow SWDs to interact with peers and teachers in multimodal ways (text, voice, videos). Incorporating screen readers (e.g., JAWS, NVDA) and voice recognition software can empower students with disabilities to engage with content in ways that were not possible before.

At the Redefinition level, technology enables entirely new learning experiences that would be impossible without digital tools. Simulations of real-world environments can help SWDs experience practical learning (e.g., science experiments for blind students using haptic feedback). Adaptive learning software can adjust the pace and complexity of instruction based

on individual needs, allowing students to learn at their own level. Expanding online education to rural areas through radio, mobile apps, and satellite internet can ensure SWDs receive equitable education opportunities. Digital storytelling apps with sign language avatars or braille-integrated devices can make learning more engaging and accessible. The SAMR model encourages educators to move beyond simply substituting traditional tools with digital tools and instead focuses on transforming teaching to provide meaningful and accessible experiences for all students, including those with disabilities (Puentedura, 2014). Furthermore, the Universal Design for Learning (UDL) guidelines offer specific strategies and recommendations for providing multiple means of representation, action, expression, and engagement to meet the diverse needs of students, including those with disabilities.

University leaders can refer to the UDL Guidelines to ensure that technology integration supports the principles of UDL and promotes equitable access to education (CAST, 2018). Generally, the relationship between these theories and the variables is that university leaders, through implementing the SAMR model, university leaders can guide instructors in progressing from basic technology integration to advanced practices, thus expanding opportunities for diverse learners. Additionally, university leaders can leverage UDL principles to ensure that learning materials and assessments are accessible and customization for all students, promoting a learning environment that proactively attends to diverse learner needs. In fact, the objectives of this framework are to improve accessibility, ensure equal opportunities for all students, enhance student engagement and participation, and promote independent learn.

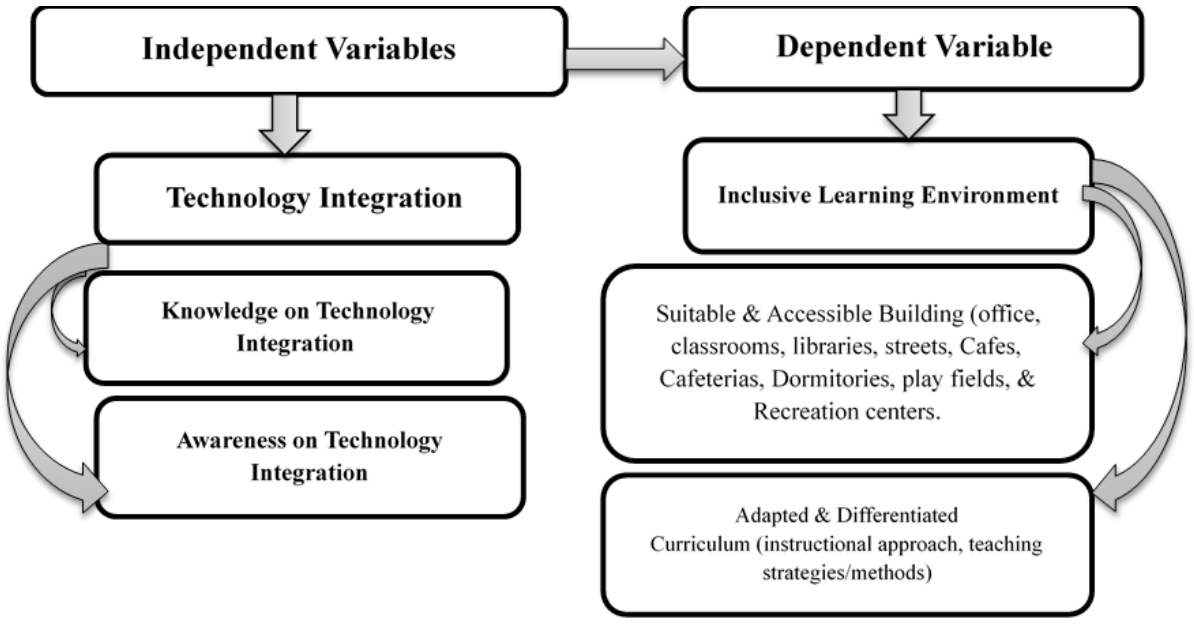

Figure: 8. *Conceptual Framework (Source: Researcher)*

2. Research Design and Methodology

2.1. Research Method and Design

Mixed methods research is a procedure for collecting, and 'mixing' both quantitative and qualitative methods. More specifically, the researcher used an explanatory sequential mixed research design consisting of collecting quantitative data and then gathering qualitative data to help explain or elaborate on the quantitative results (Creswell & Plano Clark, 2011). This design was implemented to obtain leaders' knowledge and awareness on creating inclusive learning environments through technology integration for SWDs at Jimma University.

2.2. Population of the Study

The total population in this study has 71. It encompassing the academic staff includes 21 directors, 6 coordinators, 6 college deans, 5 team leaders, and 33 department heads. Participants included leaders at BU, such as department heads, directors, college deans, team leaders, and coordinators.

2.3. Sampling and Data Collection

The researcher used a comprehensive sampling technique. According to Polit and Beck (2017) this type of sampling is useful when the population under study is small and well defined and when the research question requires a complete representation of the population.

Interviews, observation and questionnaires were used as data-gathering tools.

2.4. Validity and Reliability of the Instrument

The instruments were developed with an advisor's guidance to ensure alignment with research objectives. Feedback from researchers, lecturers, and experts refined the tools for clarity and relevance, particularly the Amharic interview version. Subject matter experts validated the content, confirming the instruments comprehensively addressed the research domain and objectives. According to Treece and Treece (1982), referring to piloting an instrument, noted that for a project with 100 people as the sample, a pilot study participation of 10-30 subjects should be a reasonable number. Therefore, this study is provided to include 10 participants. To ensure the reliability of the instruments, the researcher distributed a pilot questionnaire to leaders of Jimma University a nearby university which has similar characteristics with the main study site. The following table shows the reliability coefficients for each measured variable.

As shown in Table 1, the data indicates a Cronbach's alpha value of leaders' knowledge is 0.8730 indicates a strong correlation among the items in the measurement instrument, demonstrating good reliability. Similarly, the reliability statistics for leaders' awareness show high internal consistency, with a Cronbach's alpha value of 0.820 indicating close relationships among the items. For the status of the inclusive learning environment, Cronbach's alpha value of 0.944 confirms the high internal consistency and close relationship among the items. Overall, the Cronbach's alpha result of 0.936 indicates high internal consistency, affirming the reliability of the scale. This value, close to 1, suggests a strong correlation among the scale items, signifying its reliability and consistency.

Table 1. *Summary of findings on personalization of learning*

Reliability Statistics of the items in the instrument			
N.	Variable	N of Items	Cronbach's α
1	Leaders' knowledge	7	0.730
2	Leaders Awareness	6	0.820
3	Creating Inclusive Learning Environment	12	0.944
	Total Cronbach's α Value	36	.936

2.5. Data Collection Procedures

The researcher collected data from coordinators, directors, deans, and department heads at Jimma University using primary and secondary sources. Official research objectives were presented to participants, and questionnaires were distributed after explaining their purpose and confirming consent. Completed questionnaires were collected and reviewed within a week. For interviews, participants were briefed on the study, consented, and responded in writing during 45-minute sessions. Observations focused on classrooms, libraries, dormitories, and inclusive practices, with photos taken to document the environment. Data from interviews, questionnaires, and observations were cross-checked for consistency.

2.6. Data Analysis Procedures

The study analyzed leaders' knowledge and awareness toward creating inclusive learning environments through technology integration for SWDs using quantitative and qualitative methods. Quantitative data, including demographic variables and Likert scale items, were

analyzed using descriptive statistics (percentages, means, and standard deviations) and inferential statistics (Pearson correlation and multiple linear regressions) with SPSS version 20. Qualitative data from interviews and observations were categorized, transcribed, coded, and grouped into themes aligned with research questions. Observations were used to identify patterns and construct themes, with qualitative findings supporting the quantitative results in the discussion.

3. Results and Findings

This research aimed to assess university leaders' knowledge and awareness of creating inclusive learning environments through technology integration for SWDs, with major findings clearly described in this chapter.

3.1. University Leaders' Knowledge on Creating Inclusive Learning Environment Through Technology Integration

This table examines leaders' knowledge towards using assistive technology for creating inclusive learning environment to support students with various disabilities. The items for university leaders' understanding on creating of an inclusive learning environment consisted of 7 items which measured by a Likert scale.

As expressed in table 2, the grand mean result is 1.72. So, it indicates that there is low understanding among university leaders regarding understanding to creating inclusive learning environment through technological integration for SWDs. This is consistent with According to Sözen and Güven (2019) described the scoring range of Likert scale of the survey is strongly disagree 1.00-1.80, disagree 1.81-2.60, neither 2.61-3.40, agree 3.41-4.20 and strongly agree 4.21-5.00. Additionally, the standard deviation result ranging from 0.523, indicates that there is some variability in the perceptions but it has high consistence and reliable between the data and responses of leaders regarding these aspects. This variability suggests that differing opinions or levels of emphasis among respondents. But the range is very close to each other. So, this indicates that the data is more consistent.

In light with the descriptive result, the interview result is described accordingly. The researcher delves into these thematic categories, shedding light on the collective sentiments expressed by the interviewees. Participant CD1 (Engineering and Technology College Dean) he acknowledged limited understanding of creating technology-integrated inclusive environments for SWDs. He emphasized the need for foundational knowledge, such as ramp construction

standards, and admitted to being unaware of how to support SWDs effectively. Similarly, participant CD2 (Social Science and Humanities College Dean) has recognized the potential of technology to improve SWDs' learning outcomes but expressed confusion about appropriate tools due to a lack of interaction with these students and understanding of their needs.

Table 2. *Leaders' knowledge on creating inclusive learning environment through technology integration*

S. N	Items	Respond of the Subjects						
		1	**2**	**3**	**4**	**5**	**M**	**SD**
1	I foster students with visual impairment have a significant engagement in their education with the help of assistive technology.	23 **(37.7%)**	29 **(47.5%)**	6 **(9.8%)**	3 **(4.9%)**	- -	1.82	.806
2	I exhibit students with hearing impairment have a good time at university with the help of Sign Language videos and books.	29 **(47.5%)**	22 **(36.1%)**	6 **(9.8%)**	2 **(3.3%)**	2 **(3.3%)**	1.79	.985
3	I maintain Students with physical disabilities can reduce their academic burden by using assistive technology.	28 **(45.9%)**	20 **(32.8%)**	10 **(16.4%)**	1 **(1.6%)**	2 **(3.3%)**	1.84	.986
4	I believe that students with partial sighted can follow their education using Magnification Lens.	33 **(54.1%)**	18 **(29.5%)**	5 **(8.2%)**	5 **(8.2%)**	- -	1.69	.937
5	I understand the importance of braille for blind students.	33 **(54.1%)**	16 **(26.2%)**	10 **(16.4%)**	2 **(3.3%)**	- -	1.70	.867
6	I know the importance of magnification Lens for students with partial sighted.	31 **(50.8%)**	21 **(34.4%)**	8 **(13.1%)**	1 **(1.6%)**	- -	1.66	.772
7	I know the importance of sign language books and videos for deaf students.	35 **(57.4%)**	20 **(32.8%)**	4 **(6.6%)**	2 **(3.3%)**	- -	1.56	.764
	Grand mean						**1.72**	**.523**

Note. %=Percentage, 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree, SD = Standard deviation.

Additionally, Participant S1 (Special Needs and Inclusive Education Department), reported a lack of strong knowledge of inclusive learning and technological integration due to his professional background. Participant ID (Inclusive and Diversity Study Center) he said that admitted to no

prior knowledge or experience in creating inclusive environments for SWDs, as this was his first leadership role. He acknowledged his lack of understanding of SWD rights and needs. Participant TTCS (Technology Transfer and Community Service Directorate) reported that insufficient training and professional support as barriers to understanding. He expressed a low attitude towards integrating technology for creating inclusive environment for SWDs.

Both data sources indicate that most university leaders lack the understanding, engagement, and training needed to create inclusive learning environments for SWDs through assistive technologies. This reflects a systemic issue where insufficient knowledge, skepticism about technology, and limited training hinder effective support for SWDs. Addressing these gaps through professional development and greater engagement with SWDs could improve the integration of assistive technologies and create more supportive educational settings. This would enhance the academic experience for SWDs and align with inclusive education frameworks advocating equal opportunities for all students.

3.2. University Leaders' Awareness on Creating Inclusive Learning Environment through Technology Integration

The grand mean and standard deviation of university leaders' awareness on crating inclusive learning environment for SWDs through technological integration is 2.453 and 0.5924 respectively (Table 3), which indicated that the respondents are disagreement on the statements and the data were consistency and reliable to the mean.

As the interview result revealed that most of the respondents shows that less awareness on the issue of using a wheelchair for students with physical disabilities, the importance of hearing aids for students with hard of hearing, comprehending how cochlear implants can enhance student engagement for students with hard of hearing, understanding how a talking calculator can facilitate active learning for blind students, absorbing assistive technology can create an environment where all students can achieve academic success and understanding how to effectively use smart boards for students with partial sight in the classroom. University leaders show limited awareness of how assistive technologies, like sign language videos, magnification lenses, and braille, can support SWDs. They lack awareness of the importance of wheelchairs, hearing aids, and smart boards for SWDs in the campus. Additionally, leaders are not well-informed about how assistive technologies like talking calculators and cochlear implants can enhance the learning experience for SWDs.

Table 3. *University Leaders Awareness on creating inclusive learning environment through technology integration*

S. N	Items	Respond of the Subjects						
		1	**2**	**3**	**4**	**5**	**M**	**SD**
1	I aware the importance of hearing aids for students with hard of hearing.	18 **(29.5%)**	19 **(31.1%)**	4 **(6.6%)**	15 **(24.6%)**	5 **(8.2%)**	2.51	1.362
2	I understand the importance of wheelchairs for students with physical disability.	15 **(24.6%)**	22 **(36.1%)**	10 **(16.4%)**	12 **(19.7%)**	2 **(3.3%)**	2.41	1.160
3	I comprehend how cochlear implants can enhance student engagement for students with hard of hearing.	27 **(44.3%)**	23 **(37.7%)**	8 **(13.1%)**	3 **(4.9%)**	- -	1.79	.859
4	I understand how a talking calculator can facilitate active learning for blind students.	13 **(21.3%)**	23 **(37.7%)**	9 **(14.8%)**	15 **(24.6%)**	1 **(1.6%)**	2.48	1.134
5	I absorb that assistive technology can create an environment where all students can achieve academic success.	19 **(31.1%)**	21 **(34.4%)**	7 **(11.5%)**	11 **(18%)**	3 **(4.9%)**	2.31	1.232
6	I understand how to effectively use smart boards for students with partial sight in the classroom.	22 (36.1%)	12 (19.7%)	10 (16.4%)	11 (18%)	6 (9.8%)	2.46	1.397
	Grand mean						**2.453**	**.5924**

Note. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree, SD = Standard deviation, M = mean.

3.3. Status of the University in Creating an Inclusive Learning Environment through Technology Integration for SWDs

The following table (Table 4) has 12 items whereas each item represents a specific aspect of inclusion learning environment, such as the availability of assistive technological devices, services for deaf and blind students, and accessibility features in various facilities. It rated on a Likert scale from 1 to 5.

According to the data revealed from table 4, the result of average/grand mean of statements related to creating inclusive learning environment is 1.812. This indicates that a disagreement to the statements. And the result of standard deviation is .460. This suggesting that there is some variability in responses, but they are not highly dispersed around the mean.

Table 4. *Status of the university in creating an Inclusive Learning Environment through technology integration*

S. N	Items of Creating an Inclusive Learning Environment	Scales						
		1	**2**	**3**	**4**	**5**	**M**	**SD**
1	Classrooms are supported by various assistive technological devices.	30 **(49.2%)**	23 **(37.7%)**	6 **(9.8%)**	2 **(3.3%)**	- -	1.67	.790
2	Laboratories provide services to deaf students with the assistance of Sign Language Videos and Books.	32 **(52.5%)**	22 **(36.1%)**	6 **(9.8%)**	1 **(1.6%)**	- -	1.61	.737
3	Laboratories provide services to blind students with the assistance of braille printed instructions.	32 **(52.5%)**	18 **(29.5%)**	10 **(16.4%)**	1 **(1.6%)**	- -	1.67	.811
4	Recreational areas have braille-assisted signage for students with visual impairment	39 **(63.9%)**	18 **(29.5%)**	4 **(6.6%)**	- -	- -	1.43	.618
5	Dormitories provide Braille-assisted services for blind students.	36 **(59%)**	14 **(23%)**	10 **(16.4%)**	1 **(1.6%)**	- -	1.61	.822
6	Dormitories provide well organized signage's services for deaf students.	33 **(54.1%)**	20 **(32.8%)**	8 **(13.1%)**	- -	- -	1.59	.716
7	The offices are easily accessible for students with physical disabilities.	42 **(68.9%)**	17 **(27.9%)**	1 **(1.6%)**	1 **(1.6%)**	- -	1.36	.606
8	Smart boards/LCDs are available in every classroom for partial sighted students.	22 **(36.1%)**	18 **(29.5%)**	3 **(4.9%)**	15 **(24.6%)**	3 **(4.9%)**	2.33	1.326
9	Slate and styles are delivered to blind students in the university.	22 **(36.1%)**	21 **(34.4%)**	14 **(23%)**	2 **(3.3%)**	2 **(3.3%)**	2.03	1.016
10	Canteens have accessible ramps for students with physical disability.	28 **(45.9%)**	25 **(41%)**	8 **(13.1%)**	- -	- -	1.67	.701
11	The instructors provide technological support for students with disability during examination (for e.g., by adjusting time)	13 **(21.3%)**	22 **(36.1%)**	12 **(19.7%)**	13 **(21.3%)**	1 **(1.6%)**	2.46	1.104
12	Student with physical disability has crunch and wheelchair which delivered by university.	18 **(29.5%)**	21 **(34.4%)**	9 **(14.8%)**	10 **(16.4%)**	3 **(4.9%)**	2.33	1.207
	Average/Grand mean						**1.812**	**.460**

Note. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree, SD = Standard deviation.

Additionally, the data obtained from interviews typically provides rich, qualitative insights that can be analyzed to reveal patterns, themes, and narratives relevant to the research objectives. The direct answers provided by the participants during the interview. They often contain

subjective opinions, explanations, and personal experiences relevant to the research question. Verbal responses are typically recorded, transcribed, and coded for analysis. This helps to better understand the perspective from which the interviewee is answering.

Respondent CD1 has stated regarding with creating inclusive learning environment at Jimma University and he emphasizes that Jimma University is deeply has not committed to fostering an inclusive learning environment. So, he replied that

> *..From what I observe on the ground, SWDs have not yet received assistive devices to support their education. In fact, some students with severe disabilities have had to leave and return home due to the lack of accessible facilities on campus. I recall one student with a severe physical disability who did not have a wheelchair.*

One of the informants from directorate "(ID)" has claimed the above idea and also, he adds as directorate and observes many things but everything isn't convenient for SWDs in this campus. The material which is bought for these students is not provided till now. He pushed and raised questions in every conference and meeting. CD2 also said that creating a welcoming environment for SWDs in HEIs requires more funding, but our university provides little attention to delivering supportive academic equipment. The resource room is filled with materials, but they are not distributed to students. Essential items like hearing aids, contact lenses, and headphones are also unavailable for SWDs.

The other participant TTCS added that the laboratory, classroom, and library have not equipped with special device. IT labs have not considered SWDs. Mean that IT labs have not headphone, tap record, JAWs, and other assistive device which help for these students. Informant CD4 has reported that as college dean, he noticed that while technological integration benefits many students, there is a notable gap in the resources provided to SWDs. Despite the progress in making education more accessible, many SWDs do not have sufficient assistive technologies, such as screen readers, adaptive software, or specialized hardware that could support their educational needs.

In addition, Observation data at Jimma University revealed on three main themes: the physical environment's accessibility, utilization of assistive resources, and leaders' contributions to creating an inclusive learning environment for SWDs. The physical environment posed significant barriers, including long distances between facilities, lack of ramps, steep stairs without handrails, narrow doorways unsuitable for wheelchairs, and poorly maintained

pathways. Classrooms lacked SMART boards and LCDs, and resource rooms contained outdated materials. The campus also lacked clear signage to indicate every direction for deaf students and accessible facilities such as restrooms and dining areas, further hindering mobility and independence for SWDs. The absence of clear, accessible signage in Ethiopian universities can negatively impact engagement for SWDs, particularly those with visual, cognitive, or mobility impairments. This lack of environmental cues can lead to reduced independence, increased frustration and anxiety and exclusion from critical resources. Assistive technologies like screen readers, text-to-speech software, and ICT tools were underutilized, leaving SWDs without adequate support for academic participation. The lack of accessible infrastructure and assistive technology undermines inclusion, limiting SWDs' ability to fully engage in campus life and academic activities.

The findings reveal significant gaps in support for SWDs at the university. Classrooms lack assistive technologies like SMART boards, and laboratories fail to accommodate deaf and blind students. Recreational areas have no braille signage, and mobility aids like crutches or wheelchairs are unavailable. Instructors lack technological support during exams, and inconsistencies in providing tools like slates and styluses further hinder SWDs. The university's inclusivity commitments contradict its inadequate assistive technologies and infrastructure.

3.4. The Association between Leaders' Knowledge, Awareness, and the Status of Creating Inclusive Learning Environment through Technology Integration for SWDs

One way to assess the relationship between leaders' knowledge and awareness and the status of creating an inclusive learning environment is through correlation testing. Correlation tests allow researcher to examine the degree of association between variables, in this case, leaders' understanding and practice and creating an inclusive learning environment were tested.

Table 5 presents the correlations between three variables: Leaders Understanding, Leaders Practice, and CILE (Creating Inclusive Learning Environment). Pearson correlation coefficient test measures relations between two continuous variables in order to evaluate the strength and direction of the variables. Therefore, the data revealed that the correlation between leader knowledge and leader Awareness was 0.750^{**}, indicating a strong positive correlation between them. Similarly, the data revealed that the correlation between leaders' knowledge and CILE is 0.705^{**}, indicating a strong positive correlation. Moreover, the correlation between Leaders'

Awareness and CILE is 0.583**, indicating an extremely strong positive correlation. The significance level (p-value) associated with this correlation coefficient is 0.000, which is p <.01, indicating a significant and meaningful relationship between leaders' knowledge, leader awareness and CILE.

Table 5. *Correlation Result of Leaders Knowledge, Leaders' awareness, and CILE*

Correlation result					
			CILE	**Leaders Knowledge**	**Leaders Awareness**
Pearson Correlation Coefficient	CILE	Correlation Coefficient	1.000	.705**	.583**
		Sig. (2-tailed)	.	.000	.000
		N	61	61	61
	Leaders Knowledge	Correlation Coefficient	.705**	1.000	.750**
		Sig. (2-tailed)	.000	.	.000
		N	61	61	61
	Leaders Awareness	Correlation Coefficient	.583**	.750**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	61	61	61

** Correlation is significant at the 0.01 level (2-tailed).

Note. N = Number of respondents, CILE = Creating Inclusive Learning Environment.

Table 6 outputs represent the results of a regression analysis for a model that aims to predict the dependent variable CILE using the predictors' leaders' knowledge and leaders' awareness. The results for checking autocorrelation using the Durbin-Watson and Standard Error of the Estimate measures the accuracy of the predictions made by the model, with a value of 0.19065 indicating a relatively low error. Besides, the Durbin-Watson statistic is a test for autocorrelation in the residuals of a regression analysis. The value of 1.901 falls close to 2, which suggests that there is autocorrelation present in the independent variable (leaders' knowledge and leaders' awareness).

Table 6. *Auto-Correlation test*

Auto-Correlation test					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	.845[a]	.714	.704	.25032	1.901

[a] Predictors: (Constant), awareness, knowledge
[b] Dependent Variable: CILE

Note: CILE-Creating Inclusive Learning Environment, R-the association of independent and dependent variable.

Looking at the VIF values for the variables understanding and practice in Table 7:

The VIF value of leaders' knowledge is 1.034 and Tolerance value is .967, it suggests that there is suffer from severe multi-collinearity issues associated with the knowledge variable. Similarly, the VIF value for leaders' awareness is also 1.034 and Tolerance value is .967, indicating no multi-collinearity problem. Therefore, there is no serious multi-collinearity problem between leaders' knowledge and leaders' awareness.

Table 7. *Multi-collinearity test of independent variables*

Coefficients [a]								
	Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Tolerance**	**VIF**
1	**(Constant)**	-.027	.161		-.168	.867		
	knowledge	.545	.063	.620	8.683	.000	.967	1.034
	awareness	.367	.055	.473	6.626	.000	.967	1.034

[a] Dependent Variable: CILE

Note. B-beta value, VIF- variance inflation factor, t-test

Table 8 revealed that the correlation coefficient (R) value of 0.845 (84.5%) indicates a strong positive linear relationship between the independent variables (leaders' awareness and leaders' knowledge) and the dependent variable (creating inclusive learning environment). The coefficient of determination (R^2) value of 0.714 suggests that approximately 71.4% of the variance in the dependent variable can be explained by the independent variables in the model (creating inclusive learning environment is explained by Leaders Knowledge and Leaders Awareness). Here, the adjusted R^2 is .704 (70.4%), slightly lower than the R^2 but still high, indicating a good fit despite the inclusion of predictors. The p-value associated with the F test statistic is less than 0.001, indicating that the improvement in model fit is statistically significant.

Table 9 shows the results of an Analysis of Variance (ANOVA) test. The model includes a regression analysis with two degrees of freedom. The sum of squares for the regression is 9.069 and for the residual are 3.634. The p-value is .000. The F-statistic for the regression is 72.368, and then from the above table show that the statistical value is greater than the tabulated value

there is a statically significant between the independent variables and the dependent variable. So, the ANOVA results suggest that the regression model is a good fit.

Table 8. *Model Summary (R & R²)*

Model Summary [b]									
					Change Statistics				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.845[a]	.714	.704	.25032	.714	72.368	2	58	.000

[a] Predictors: (Constant), awareness, knowledge
[b] Dependent Variable: CILE

Note. R = the relationship between the variable, R² = the total effect of all independent variable on dependent variable, sig. F = Significant factor, df = Degree of freedom.

Table 9. *ANOVA Result*

ANOVA [a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	**Regression**	9.069	2	4.535	72.368	.000[b]
	Residual	3.634	58	.063		
	Total	12.704	60			

[a] Dependent Variable: CILE
[b] Predictors: (Constant), Awareness, Knowledge

Note. CILE = creating inclusive learning environment, df = degree of freedom, sig = significant, ANOVA = Analysis of Variance.

3.5. Strategies to University Leaders' while Creating Inclusive Learning Environment through Technology Integration for SWDS

Table 10 shows that majority of the respondents 25 (41%) respond that training and collaboration with SWD services and the evaluation and improvement of accessibility and Sharing experiences have ways to enhance leaders' knowledge and awareness for creating inclusive learning environments through technology integration for SWDs.

Inline to this, the data obtained from interview regarding the strategies that adopt to enhance leader knowledge and awareness of creating inclusive learning environment for SWDs through technological integration, most of the respondents elaborated the same ideas. Participant CD1 has reported that most of the time training and sharing experience is very important to enhance the knowledge and awareness level of leaders for creating inclusive learning environment for

SWDs through technological integration. However, two informants "CD2" and "TTCS" has shared that training, competency, collaboration with disability support service and sharing experiences are pivotal components in fostering a deeper knowledge and proficiency among leaders in the realm of creating inclusive learning environment, particularly concerning SWDs. Similarly, respondent ID has also said that sharing experiences further enriches this process, allowing leaders to exchange best practices, troubleshoot challenges, and cultivate a collaborative community dedicated to fostering inclusivity. In addition, participant CD4 and S1 has responds the same concept. They reported that, ultimately, investing in training and sharing experiences equips leaders with the knowledge and skills needed to create inclusive learning environments where every student can thrive. Therefore, training and collaboration with SWD services support, the evaluation and improvement of accessibility, and sharing experiences are the most frequently adopted strategies for enhancing leaders' knowledge and awareness for creating inclusive learning environments for SWDs through technology integration.

Table 10. *Strategies to be Improved*

What strategies can university leaders adopt to enhance their knowledge and awareness of creating an inclusive learning environment for SWDs through technology integration?			
		Frequency	**Percent**
Valid	training, collaboration with SWDs services, evaluate and improve accessibility	25	41.0
	competency, frequently follow up	2	3.3
	providing assistive technology	9	14.8
	sharing experience	25	41.0
	Total	**61**	**100.0**

Note. CILE = creating inclusive learning environment, df = degree of freedom, sig = significant, ANOVA = Analysis of Variance.

4. Conclusions and Recommendations

4.1. Conclusions

By aiming to assess university leaders' knowledge and awareness of creating inclusive learning environment through technological integration for SWDs, based on the findings, the following conclusions are drawn for each basic question. Generally:

- ✓ University leaders have absence of knowledge of how to effectively create inclusive learning environments through technological integration for SWDs.
- ✓ The awareness of university leaders in creating inclusive learning environments through technological integration for SWDs are currently low extent.
- ✓ The association between the three variables (leaders' knowledge, leaders' awareness and creating inclusive learning environment) demonstrates a strong positive correlation. The statistical significance of this correlation ($p < 0.05$) suggests that this relationship is not due to random variation but reflects a reliable and meaningful connection. The result of Pearson correlation coefficient indicates that the variable has strong positive relationship with each other. Furthermore, the result of regression analyses of the variable has revealed that statistically significant relationship with a p- value is .00. This underscores the critical role that informed leadership plays in shaping inclusive practices, particularly through the integration of technology to support SWDs.
- ✓ The strategies to enhance leaders' knowledge and awareness in creating inclusive learning environments through technological integration for SWDs include comprehensive training on assistive technologies and inclusive design, regular evaluation of their practices to ensure progress, and close cooperation with disability support services to address specific needs.

4.2. Recommendations

These recommendations emphasize the importance of university leaders' knowledge and awareness which proactive engagement in creating an inclusive atmosphere that leverages technological advancements.

- ➢ For top-level university leaders expected to take the lead in policy formulation, ensuring that institutional policies are regularly updated to comply with legal standards and reflect best practices in accessibility.
- ➢ Middle-level university leaders better to establish a cross-departmental task force to audit assistive technology needs biannually, such as IT, disability services, and academic faculties, to ensure that assistive technologies are not only available but are effectively integrated into the curriculum.
- ➢ At the lower administrative levels, department heads and academic leaders expected to focus on providing direct support to SWDs by actively identifying their individual needs

and ensuring they have access to the appropriate technologies and promoting a culture of inclusion within departments.

- The minister of education had better establish clear policies and guidelines that emphasize the importance of inclusivity and technological integration for students with disabilities.

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