The Impact of Attitudes related to Knowledge, Skills, and Emotion on the Understanding of Sign Language among Medical Students

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Abstract

Understanding sign language is the most critical factor for the success of deaf pupils in educational institutions, and policymakers and researchers must focus on this aspect. Therefore, the current study investigates the effect of attitude regarding knowledge, skills, and sentiments on medical students' comprehension of sign language in Saudi Arabian educational institutions. The research also investigates the moderating effect of training seminars on the attitudes of Saudi Arabian medical students regarding their knowledge, skills, emotions, and comprehension of sign language. The study collects primary data from medical students at educational institutions using survey questionnaires. Smart-PLS was also used to examine the data sensitivity and association between variables. The results revealed that Saudi Arabian medical students' knowledge, skills, and emotions-related attitudes have a positive relationship with their understanding of sign language. The results also revealed that the training workshops substantially moderate the attitudes of Saudi Arabian medical students regarding their knowledge, skills, and emotions, as well as their comprehension of sign language. The study assists regulators in formulating rules that will enhance the understanding of sign language by applying knowledge, skills, and emotions.

Keywords: Attitude, knowledge, skills, emotions, understanding of sign language, training workshops

Introduction

Language is a system of symbols used by humans for various purposes, including acquiring information, communicating, and conveying requests. This system is based on symbols that can be visual or audible, depending on the language's characteristics. This system consists of two major components, namely expressive and receptive language. Expressive language denotes an individual's response to communicate or reveal themselves, whereas receptive language encompasses the perception of conducting what is verbally communicated, listening skills, and external symbols. A significant portion of the sector employs verbal language for thought transmission. Due to their ability to process and receive auditory and visual stimuli in their environment, people with typical development can construct their language structure rapidly (Bilgiç et al., 2021). The sense organs play a significant role in developing speech and language abilities.

On the other hand, hard-of-hearing individuals (those who struggle with the use and perception of spoken language and the perception of vocal stimuli) can be

negatively affected. For hearing-impaired individuals to demonstrate growth in academics, interact with the environment, and compensate for or address the negative situation, a model for communication should be devised taking disability level, support, and age into account. Sign language is classified as either non-verbal or verbal (Weber, 2020). Sign language is the method of communication utilized by hearing-impaired individuals with severe impairment problems, inappropriate device utilization, suffering from late diagnosis, and lack of support in the form of special education. In situations where a person cannot acquire or use verbal language, sign language assists them in communicating their thoughts, playing an essential role in social acceptance and personal growth. Sign language can aid hearing-impaired individuals with no verbal language in achieving intellectual and academic growth and interacting with society. Previous research has demonstrated that sign language positively affects hearing-impaired individuals' affective, cognitive, and social development. The most remarkable aspect of language is that it can be learned and processed just as readily by ear and mouth as by eye and hand (Mathews et al., 2022). Briefly, language can develop from either spoken words or manual gestures. Nowadays, it is not controversial to assert that sign language is a genuine language that is functionally and structurally equivalent to spoken language.

Nonetheless, acceptance in the contemporary world has given rise to numerous fundamental concerns (Rastgoo et al., 2021). Incorporating sign language into human languages could prompt individuals to reconsider the concept of human language. Numerous factors, such as knowledge, abilities, and emotions, significantly affect sign language comprehension.

The significance of attitude toward sign language comprehension cannot be overstated. Positivity toward the deaf community and sign language can increase motivation and willingness to practice and learn sign language and appreciate and comprehend deaf culture. Numerous factors, including knowledge, abilities, and emotion, play a significant role in sign language comprehension. Knowledge refers to comprehension, abilities, or language acquired through education, experience, or observation. Knowledge can be both practical and theoretical, leading to diverse contexts, including professional development, personal development, and cultural

and social issues. It can be transmitted and shared via various channels, including discussions, lectures, interactive experiences, and books (Kung et al., 2021). Through training, experience, practice, and education, an individual gains expertise, knowledge, and ability, referred to as skills. They can be interpersonal or technical and are essential for academic, personal, and professional success (Humphries et al., 2019). Emotions represent the physiological and psychological states frequently reflected in physical responses, subjective emotions, and behavioral manifestations. On a comprehensive scale, external or internal stimuli trigger emotions, including durations and intensities. Humans can sense or experience various emotions, ranging from sadness, fear, happiness, and surprise to more complex ones like envy, shame, and love. Negative, neutral, and positive emotions can vary in duration, expression, and intensity based on the situation and the individual (Schmitz, Holloway, & Cho, 2020; Wilson-Mah & MacRae, 2022).

The sign language of Saudi Arabia's deaf community has flourished and evolved over generations, and the necessary measures have been taken to accommodate this community. In 2017, Saudi Arabia enacted the Disability Law, which stipulated that the government should make accommodations for people with any disability, particularly those with hearing problems or who are deaf. This law mandated that nonprofit organizations and government agencies provide access and reasonable accommodations, such as captioning and language interpretation. The Saudi government has established sign language centers and is attempting to establish more to provide interpretation services to the deaf community via government institutes, educational institutes, and hospitals. These centers also offer seminars or programs for sign language interpreters. In addition, the Saudi government has implemented initiatives to aid in the education of deaf children. The government also attempts to provide unique educational initiatives or programs to aid deaf students. It has built particular institutions for this community so that deaf individuals can excel in various aspects of their lives. The Saudi government is also adopting various measures to improve and expand media access for the deaf community, such as SABC's provision of sign language interpretation for various television programs (Rönnberg, Holmer, & Rudner, 2019). Their government is also promoting the need

for and understanding of sign language through awareness campaigns, and these campaigns do their best to promote the rights of this community. These awareness campaigns emphasize the significance and necessity of sign language within the deaf community.

Nevertheless, despite these measures, the deaf community in Saudi Arabia continues to face obstacles, which necessitate additional government action. To address this deficiency, this paper has highlighted the factors that aid sign language comprehension. Bilgiç et al. (2021) analyzed the function of various factors in assisting the deaf community in their research on this topic. The purpose of this paper is to offer assistance to the impaired community. Knowledge, abilities, emotions, and training seminars play a significant role in comprehending this sign language.

Literature Review

Sign language is created or generated predominantly through facial expressions, hand and body movements, visual symbols, and gestures. However, it has different sentence structures and grammar from the language of speech upon which it is based. It has been said that each country or region has a sign language with its own cultural and linguistic characteristics. Sign language is closely related to the country's spoken language, but there are differences in sentence structure and grammar. In spoken language, new and meaningful words can be created by altering a word's sound, whereas in sign language, new words are expressed or represented with different signs. Especially in educational settings, sign language is used to assist and aid the development of pupils with limited or no speech development. Evidence shows that individuals prefer using sign language at school or daily, even if they use spoken language infrequently. Teachers, such as field teachers or exceptional education instructors, who work with hearing-impaired students with limited verbal language skills must have a command of sign language.

Hearing-impaired individuals must have extensive knowledge to comprehend sign language. To comprehend or learn sign language, one must have knowledge or information about its vocabulary, grammar, social and cultural context, and syntax. People should be familiar with sign language's grammatical norms and vocabulary

(Mathews et al., 2022). This consists of movements, hand structures, or body language used to generate signs, and the comprehension of signs is incorporated into constructing meaningful sentences. Without foundational knowledge, comprehending and acquiring the meaning of this sign language would be impossible or challenging. In addition, it is essential to understand the social and cultural context to sign language vocabulary and grammar. Sign language varies from country to country and cannot be considered universal because each region has its sign language with distinct idioms and characteristics. Understanding the fundamental structure of signed communication requires an awareness of the values and culture of the deaf community (Panko et al., 2021). Sign language is an ever-changing language comprised of numerous dialects and styles; therefore, institutes must emphasize sign language comprehension. This dialogue leads to the following conclusion:

H1: *The positive impact of knowledge in understanding sign language.*

To comprehend sign language, skills play a significant and crucial function. To comprehend this language, you need motor skills and visual perception, among others. In terms of motor skills, users of sign languages should have the information or knowledge necessary to create signs fluently and accurately, employing various movements or shapes to convey meaning. Developing motor skills may require extensive practice, but it is essential for effective sign language communication. Visual perception is another essential skill that significantly contributes to sign language comprehension (Paul et al., 2020). With this ability, individuals should accurately perceive the signs used in sign language and non-manual signals (body language, facial expressions, and eye fixation) essential to sign language grammar. In addition to linguistic and cognitive processing abilities, sign language comprehension requires additional skills. The user of sign language must be able to comprehend visual-spatial information and use the sign language's vocabulary and grammar (Fellinger et al., 2020). Practical memory skills are essential for learning language structures and signals and expanding one's vocabulary. Furthermore, communication skills are essential for sign language comprehension, and users must be able to comprehend the values or norms of the deaf community to participate in sign language communication

fully. In brief, these skills are crucial for understanding sign language fundamentals and achieving complete fluency. This dialogue leads to the following conclusion:

H2: *The positive role of skills in understanding sign language.*

Emotions are crucial to sign language comprehension. Sign language is founded on nonverbal and visual communication, including body language, facial expressions, and nonverbal cues to convey a message or emotion. Facial expressions are fundamental and essential components of sign language and can be used to convey emotions. However, emotions also influence how sign language is comprehended and perceived. Previous research indicates that individuals with solid emotions can accurately interpret and perceive sign language, as emotions influence attention and processing, which are crucial for comprehending sign language (Freitas et al., 2022).

Moreover, accurately conveying emotion is essential for effective communication among interpreters. Conveying emotions contributes to the communication's meaning and context. In conclusion, emotions are a significant and essential component of sign language that aids in comprehending the intended message. This dialogue leads to the following conclusion:

H3: *The positive role of emotions in understanding sign language.*

Knowledge of sign language is the ability to produce and recognize signs and acquire the syntax, vocabulary, and grammar of the language. A person who understands sign language can interpret, comprehend, and use this language for communication. Workshops on any aspect of life are important because they help individuals learn and comprehend concepts. Training works play a significant moderating role between sign language knowledge and comprehension. These workshops offer participants the chance to learn about these signs and communication strategies and practice sign language. These workshops endowed individuals with sign language knowledge and enhanced their comprehension so they could communicate more effectively. Individuals with a fundamental understanding of this language can benefit from these seminars on cultural nuances and legal terminology (Garberoglio et al., 2020). Participating in these training seminars facilitates their

comprehension of the language and its application in various contexts and improves their ability to acquire this language quickly. The training workshop's moderating function in sign language and knowledge focuses on the practice and ongoing education of those who wish to learn and concentrate on this language.

H4: *The moderating role of training workshops between knowledge and understanding of sign language.*

A person's sign language skills indicate their ability to create and use signs fluently, appropriately, and accurately. Understanding sign language indicates the capacity to interpret, acquire, and use this language for communication. Training seminars serve as a mediator between sign language skills and comprehension. Training workshops are essential for individuals, particularly those with hearing-impaired issues and those who wish to learn to instruct hearing-impaired individuals (Jacob et al., 2022). These seminars offer participants the chance to acquire new skills by teaching them new strategies for practicing their sign language abilities. These workshops improve sign language-related abilities and aid in comprehending and effectively using this language in daily life. These workshops concentrating on innovative signing techniques, such as body language and facial expressions, are also beneficial to those who already have some knowledge of this language. These seminars assist individuals in refining their skills and applying them in various contexts. However, the training workshops play a moderating role in the skills and comprehension of this language. They emphasize the significance of practice and learning for those who wish to become sign language experts and those with hearing impairments. These workshops help individuals improve their communication skills, increasing their employment, educational, and social opportunities. This preceding discussion generates the following hypothesis:

H5: *The moderating role of training workshops between skills and understanding of sign language.*

Emotions represent individuals' disposition or effective state in relation to sign language, whereas sign language comprehension focuses on the capacity to use sign

language effectively. Alzuguren, Sánchez-Gómez, and Costa (2019) found that seminars play a significant and crucial role in assisting individuals in conveying their message through emotions and learning sign language. Individuals with hearing impairments and those who wish to excel in sign language are taught how to interpret their message using their emotions in workshops. Emotions are such vital emotions that motivate individuals to act differently. Training seminars allow participants to apply their emotions to sign language (Sweet et al., 2020). Workshop focuses on interactive sessions such as social learning, role-playing, etc., to enhance learning outcomes. Briefly, the training seminars play a moderating role in effectively utilizing emotions to comprehend sign language. In addition to fostering motivation and self-assurance, these seminars provide numerous opportunities for language practice.

H6: *The moderating role of training workshops between emotions and understanding of sign language.*

Research Methods

This study examines the influence of attitude regarding knowledge, skills, and emotions on the comprehension of sign language and the moderating role of training workshops between attitude regarding knowledge, skills, and emotions and comprehension of sign language among medical students in Saudi Arabian educational institutions. The study collects primary data from medical students at educational institutions using survey questionnaires. The study's constructs are evaluated with queries. For instance, knowledge is measured with four questions taken from Taghrir, Borazjani, and Shiraly (2020), skills are measured with six items taken from Teng et al. (2019), emotions are measured with four questions taken from Chen (2019), training workshops were measured with five questions taken from Gupta and Guang-Lea (2020), and understanding of sign language is measured with six questions taken from Mohamedi, Schouwstra, Smith, Chow, and C

As respondents, the study selected medical students from institutions that educate deaf students. The respondents were selected using systematic sampling. Personal visits to the institutions were utilized to distribute the surveys to the selected students. The researchers sent out approximately 564 questionnaires but only received

312 back, a response rate of approximately 55.32 percent. Smart-PLS was also used to examine the data sensitivity and association between variables. This tool was chosen because it efficiently handles primary data and produces the best results with sophisticated models and large data sets (Hair et al., 2017). The study employed knowledge (KN), skills (SKL), and emotions (EM) as predictors. In addition, training workshops (TW) and understanding of sign language (USL) were employed as moderating constructs and dependent variables, respectively. The framework depicting these variables is shown in Figure 1.

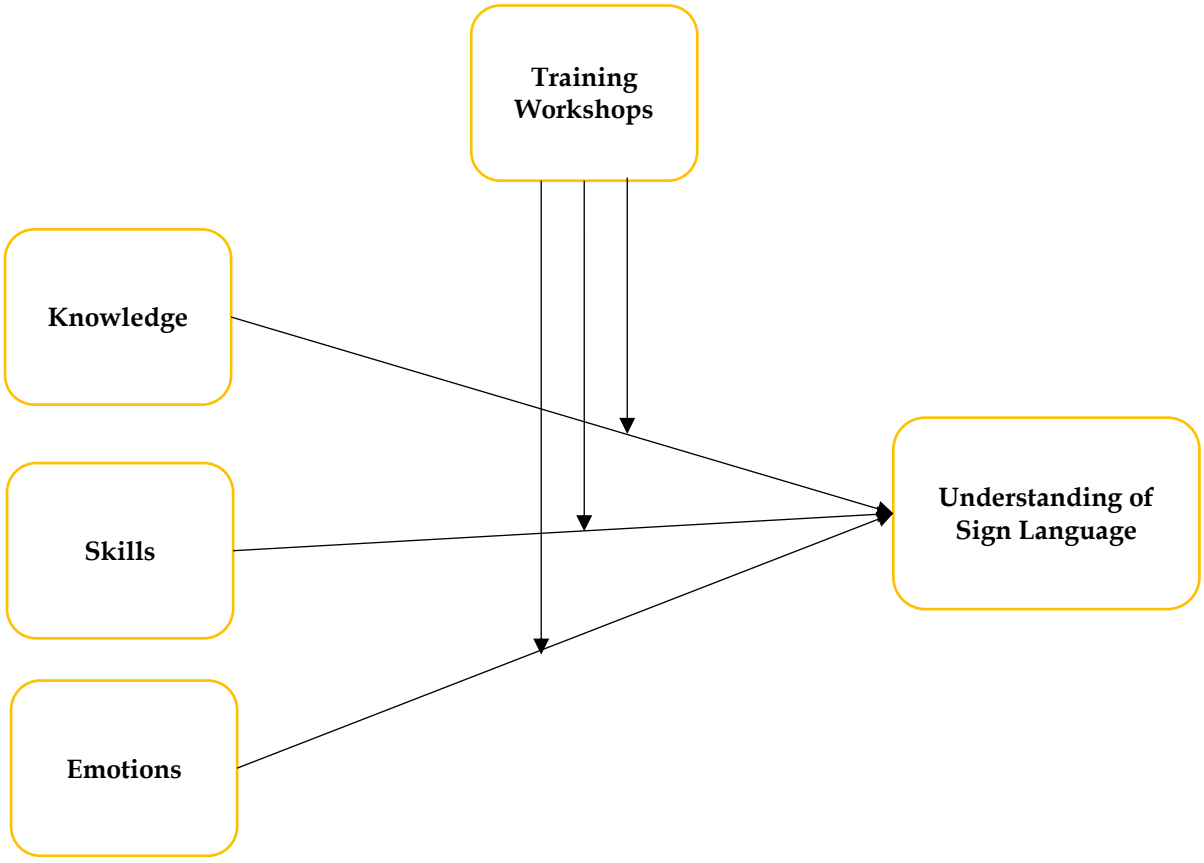

Figure 1: Theoretical framework

Research Findings

The study results demonstrate convergent validity. The loadings have values greater than 0.50, the average variance extracted (AVE) has values greater than 0.50, Alpha has values greater than 0.70, and composite reliability (CR) has values greater than 0.70. These numbers demonstrated convergent validity. These numbers are presented in Table 1.

Table 1: Convergent validity

Constructs	Items	Loadings	Alpha	CR	AVE
Emotions	EM1	0.877	0.833	0.899	0.749
	EM2	0.848			
	EM4	0.870			
Knowledge	KN1	0.908	0.766	0.848	0.589
	KN2	0.844			
	KN3	0.703			
	KN4	0.570			
Skills	SKL1	0.744	0.857	0.893	0.582
	SKL2	0.746			
	SKL3	0.777			
	SKL4	0.800			
	SKL5	0.747			
	SKL6	0.762			
Training Workshops	TW2	0.862	0.883	0.918	0.738
	TW3	0.916			
	TW4	0.897			
	TW5	0.753			
Understanding of Sign Language	USL1	0.703	0.817	0.863	0.514
	USL2	0.785			
	USL3	0.631			
	USL4	0.640			
	USL5	0.718			
	USL6	0.808			

The study results also demonstrate discriminant validity. The Fornell-Larcker test demonstrates that the figures revealing the association with itself are more significant than those revealing the association with other variables. These numbers demonstrated discriminant validity. These numbers are presented in Table 2.

Table 2: Fornell Larker

	EM	KN	SKL	TW	USL
EM	0.865				
KN	0.478	0.768			
SKL	0.544	0.582	0.763		
TW	0.613	0.472	0.436	0.859	
USL	0.525	0.516	0.720	0.477	0.717

In addition, cross-loadings were used to examine the discriminant validity, revealing that the figures revealing the association with itself are more significant than those revealing the association with other variables. These numbers demonstrated discriminant validity. These numbers are presented in Table 3.

Table 3: Cross-loadings

	EM	KN	SKL	TW	USL
EM1	**0.877**	0.470	0.479	0.577	0.494
EM2	**0.848**	0.388	0.466	0.519	0.426
EM4	**0.870**	0.375	0.465	0.491	0.438
KN1	0.448	**0.908**	0.734	0.435	0.700
KN2	0.426	**0.844**	0.591	0.503	0.661
KN3	0.303	**0.703**	0.652	0.192	0.397
KN4	0.236	**0.570**	0.408	0.213	0.311
SKL1	0.364	0.410	**0.744**	0.355	0.485
SKL2	0.477	0.664	**0.746**	0.315	0.639
SKL3	0.427	0.391	**0.777**	0.359	0.504
SKL4	0.371	0.462	**0.800**	0.361	0.519
SKL5	0.408	0.758	**0.747**	0.281	0.516
SKL6	0.420	0.823	**0.762**	0.330	0.596
TW2	0.504	0.349	0.300	**0.862**	0.363
TW3	0.507	0.470	0.383	**0.916**	0.422
TW4	0.676	0.484	0.484	**0.897**	0.525
TW5	0.327	0.250	0.272	**0.753**	0.252
USL1	0.325	0.378	0.392	0.241	**0.703**
USL2	0.389	0.452	0.486	0.304	**0.785**
USL3	0.355	0.327	0.342	0.197	**0.631**
USL4	0.387	0.327	0.429	0.381	**0.640**
USL5	0.391	0.641	0.614	0.416	**0.718**
USL6	0.412	0.749	0.688	0.429	**0.808**

In addition, Heterotrait Monotrait (HTMT) ratio was also used to check the discriminant validity, showing the figures are lower than 0.90. These figures indicated valid discriminant validity. These figures are given in Table 4.

Table 4: Heterotrait Monotrait ratio

	EM	KN	SKL	TW	USL
EM					
KN	0.574				
SKL	0.637	0.741			
TW	0.680	0.507	0.483		
USL	0.629	0.789	0.804	0.507	

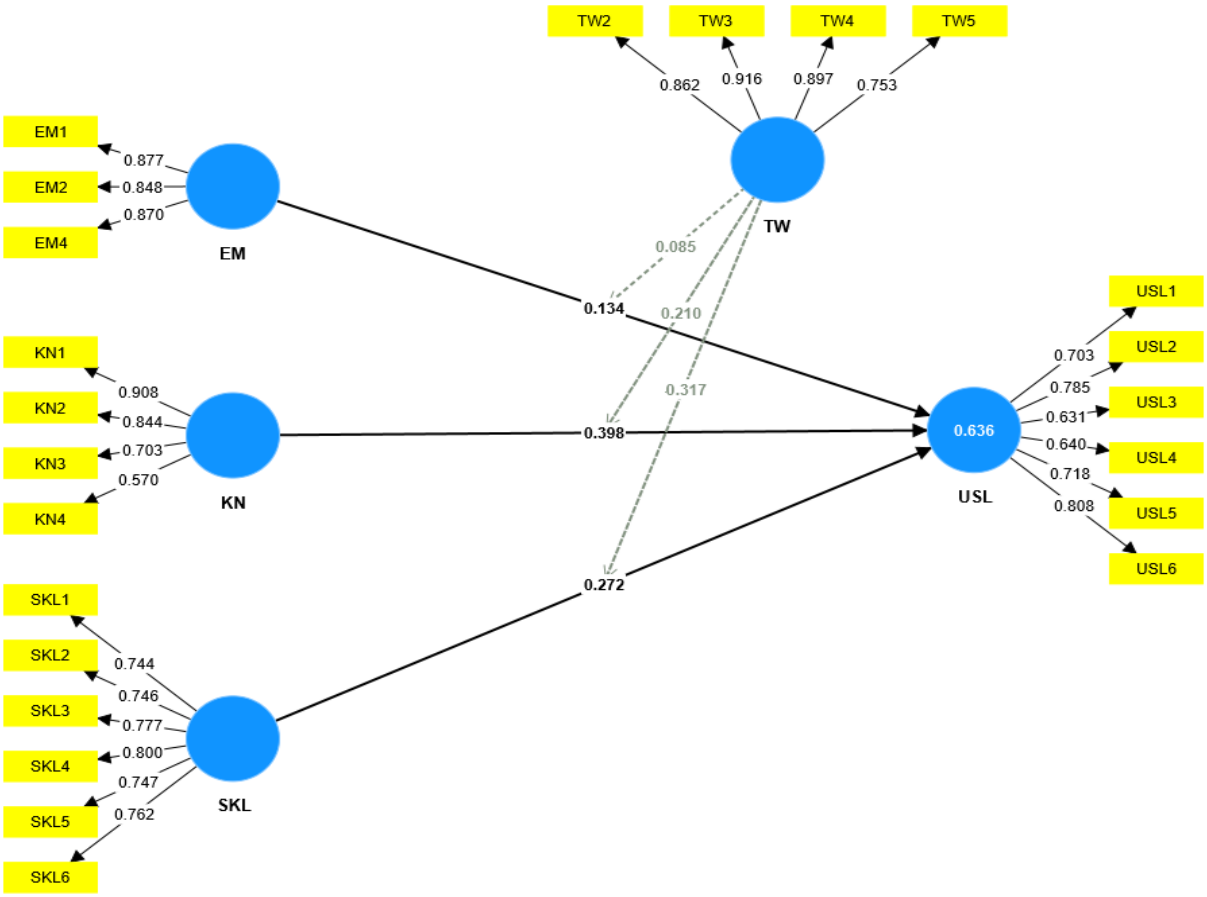

Figure 2: Measurement model assessment

The results revealed that attitudes about knowledge, skills, and emotions are positively associated with medical students' understanding of sign language in Saudi Arabian educational institutions, accepting hypotheses H1, H2, and H3. In addition, the results demonstrated that the training workshops considerably moderate attitudes regarding knowledge, skills, and emotions, as well as comprehension of sign language, among Saudi Arabian medical students attending educational institutions that accept H4, H5, and H6. These relationships are listed in Table 5.

Table 5: Path analysis

Relationships	Beta	Standard deviation	T statistics	P values
EM -> USL	0.134	0.044	3.065	0.002
KN -> USL	0.398	0.062	6.394	0.000
SKL -> USL	0.272	0.067	4.034	0.000
TW x SKL -> USL	0.317	0.085	3.726	0.000
TW x EM -> USL	0.085	0.050	1.707	0.089
TW x KN -> USL	0.210	0.074	2.823	0.005

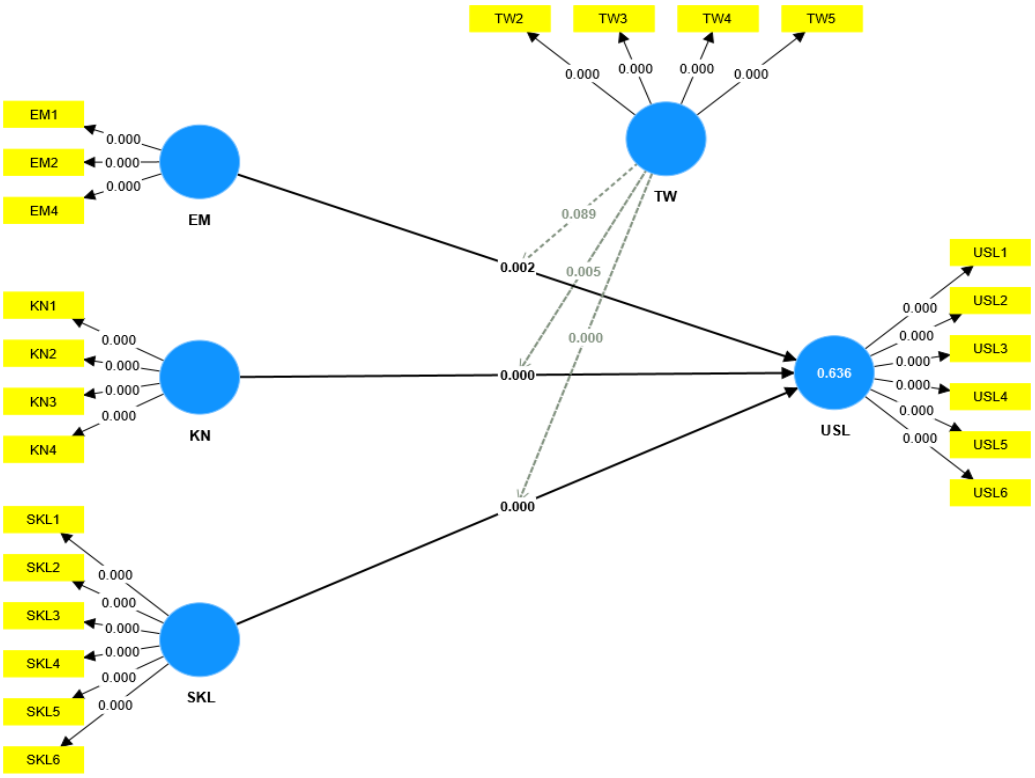

Figure 3: Structural model assessment

Discussions

The results demonstrated that knowledge has a positive effect on sign language comprehension. El-Alfy and Luqman (2022) also supported this hypothesis. A survey was used to obtain the data. They also indicated that hearing-impaired individuals could, with the aid of knowledge, gain access to the grammar and vocabulary necessary to comprehend sign language. Additionally, Bragg et al. (2019) have supported this hypothesis. In addition, they indicated that knowledge assists individuals with hearing loss in developing the foundational skills necessary to comprehend sign language symbols. Understanding the grammar and vocabulary of this sign language requires a significant amount of knowledge. The results demonstrated that skills positively affect sign language comprehension. In a previous study, Hall, Hall, and Caselli (2019) also concluded that sign language is essential to comprehending sign language. They also mentioned that comprehending sign language requires skill. Additionally, skills aid in comprehending the message that deaf individuals wish to convey. In addition, Marippan and Yasin (2020) found sign language abilities are essential in their research.

The results demonstrated that emotions facilitate sign language comprehension. Kumar, Roy, and Dogra (2018) also supported this hypothesis with their research. In their research, they utilized Independent Bayesian Classification Combination. They indicated that individuals could utilize emotions to fathom sign language. Additionally, research conducted by Bantupalli and Xie (2018) supported this hypothesis. They researched the American community and concluded that emotions aid the deaf community in understanding sign language and deciphering the intended message. The results indicated that training seminars moderate the relationship between sign language knowledge and comprehension. Studies conducted by Camgoz et al. (2020) also supported the significance of training seminars for enhancing sign language knowledge. In addition, Bragg et al. (2019) emphasized the significance of sign language training seminars. The workshop provides opportunities for the deaf community to learn the grammar and vocabulary of this language, which assists them in understanding sign language.

The results indicated that training workshops moderate the relationship between sign language skills and comprehension. Pappas et al. (2018) supported this theory as well. Workshops aid hearing-impaired individuals in enhancing their ability to interpret sign language. Individuals with hearing impairments could grasp the language by attending these seminars, allowing them to integrate and participate in the social and cultural environment.

The results indicated that training workshops moderate the relationship between emotions and sign language comprehension. Sharp, Bacon, and Champoux (2020) also found that training workshops help individuals with hearing impairments use their emotions when communicating with society. Alawajee (2021) additional research also supported this hypothesis. According to him, training workshops are essential because they play a significant role in spreading awareness about the use of signs and in gaining a comprehension of the surrounding environment.

Implications

This research article contributed to the body of knowledge by analyzing Saudi Arabian institutes. The deaf community of Saudi Arabia is also confronted with issues

that must be resolved for deaf individuals to achieve success in life. The deaf community requires assistance and support in the form of initiatives that afford them opportunities to discerning sign language. It would be challenging to communicate in the deaf community without comprehending sign language, particularly for deaf people and those who wish to understand sign language comprehensively. This article has examined the function of knowledge, skills, emotions, and training workshops in sign language comprehension.

With the rapid increase in human rights awareness, NGOs, government agencies, and other institutions are also concentrating on the rights of deaf individuals to understand sign language. The study assists regulators in formulating rules that will enhance the understanding of sign language by applying knowledge, skills, and emotions. This paper assists managers, policymakers, and regulatory and government agencies in implementing strategies that aid the deaf community in understanding sign languages. To comprehend sign languages, the deaf community requires training seminars, knowledge, skills, and emotional support. To assist the deaf community, these individuals must have the knowledge, skills, and emotions necessary to acquire sign language.

Limitations

The limitations of this paper can be transcended in the future. First, this paper employs three significant variables in sign language comprehension: knowledge, skills, and emotion. In the future, additional variables such as technology and cultural or social impact can be investigated for their effect on sign language comprehension. Second, this article has only used training workshops as a moderator between sign language knowledge, skills, emotions, and comprehension. Future researchers can use government funding or educational institutions as moderators to examine the relationship between sign language knowledge, skills, emotions, and comprehension. This research was conducted in Saudi Arabia, which precludes its applicability in Europe and other Asian nations. Sign language varies from region to region, and this study can also be conducted in other countries.

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