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Development and Validation of the Tablet-Based ERAL Nonverbal Intelligence Test 5-17 (ERAL-NIT)

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Abstract

Intelligence has been extensively explored across various disciplines such as psychology, cognitive science, and neurology. Countless scholars have delved into understanding why certain individuals exhibit higher mental acuity and knowledge. Consequently, numerous studies aim to unveil the essence of intelligence and gauge human cognitive capacity. This study introduces and validates the ERAL Nonverbal Intelligence Test (ERAL-NIT) for children aged 5 to 17. Unlike many existing tests, ERAL-NIT is nonverbal, accommodating diverse linguistic backgrounds. Moreover, it incorporates parental assessments, enhancing its holistic approach. Administered via tablet with specialized software, ERAL-NIT provides comprehensive reports to practitioners and families. Its development integrates analyses of hemispheric specialization and executive functions of different brain areas. Content validity is ensured through expert input, while criterion validity is established by comparing results with established assessments and medical diagnoses. ERAL-NIT yields insights into pervasive developmental disorders, specific learning disabilities, attention deficits, and language disorders, thereby enriching diagnostic practices.

Keywords: nonverbal intelligence test, test development, test validation, test construction, neuro-cognitive IQ test.

1. Introduction

There has always been hot debate on the definition of intelligence. The roots of the term go back to ancient Greeks and Romans. First Cicero coined the word 'intelligence', and it was used as a man's mental capacity and intellectual abilities. Since those times, various practitioners have attached different meanings to the term. Although there has never been consensus on what constitutes intelligence or how to operationalize it, a variety of definitions have been suggested by different scholars. Mainly those definitions can be grouped under three categories: (i) the cognitive capacity to learn, reason, think and solve novel problems (Anderson, 2006; Bingham, 1937; Herrnstein & Murray, 2010), (ii) the total knowledge a person has acquired (Henmon, 1921), and (iii) the ability to adapt to new situations and to the environment successfully (Anastasi, 1992; Gardner, 1993; *An Interview with Dr. Simonton*, 2003; Pintner, 1921).

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In a similar vein, Ackerman's (1996) meta theory of intelligence distinguishes between intelligence as knowledge and intelligence as process. His model suggests that intelligence is not a single one-dimensional construct, but rather consists of many factors. Ackerman suggests that intelligence as knowledge refers to people's existing knowledge structures, whereas intelligence as process refers to people's abilities to process information.

These various understandings of intelligence are particularly effective at demonstrating the need for different types of measures. There are multiple underlying theoretical constructs beneath those instruments. It is out of the scope of this study to discuss those theories fully. Yet, a brief overview of some of the major theories of intelligence is believed to shed light into the theoretical part of the current study.

General intelligence theories are classified under two categories; single factor theories and multiple factor theories. Spearman (1927) suggests that there is one factor or mental attribute, which he calls g or general intelligence, but it also requires some specific abilities. A current version of the general plus specific abilities theory is John Carroll's (Carroll, 1993) three-stratum (3S) theory of intelligence identifying abilities that correspond to surface level characteristics of mental tasks, broad abilities, highly abstract, and general abilities that affect all tasks requiring cognitive ability (Benson et al., 2018).

Today, one factor theories of intelligence are challenged by Multiple factor theories. The most widely accepted view is that intelligence has many facets and consists of a hierarchy of abilities. Sternberg (1985) in his Triarchic theory of intelligence suggests a cognitive process approach to understand intelligence. According to him it has three parts; analytic part- it involves mental processes and the ability to think abstractly, creative experiential part- coping with new experiences, automaticity in thinking, problem solving, and practical part- adaptation to culture and tacit knowledge that is learned in everyday life. Similarly, Sattler (2001) believes that there are many independent faculties that make up intelligence. Years ago, Thurstone (1943) listed seven distinct major mental abilities that make up intelligence as verbal comprehension, memory, and reasoning, ability to visualize spatial relationships, numerical ability, word fluency, and perceptual speed.

In the light of the above given theories of intelligence, there have been consistent efforts by researchers to build a single theory of intelligence. Yet, it is crystal clear that intelligence is a multidimensional concept; it is not just about measuring how good you are at certain aspects, but "…[it] correlates with other aspects of a person such as personality or motivation, and these factors are likely to make a difference to education and life outcomes, too" (Ball, 2018: 34).

1.1 *Measures of intelligence*

Based on the evidence that there are indeed different theories of intelligence, many different measures of intelligence have emerged in time. However, according to Naglieri, Das and Jarman, early measures of intelligence are too narrow and limited in their measurement of intelligence (Naglieri & Prewett, 1990). They mainly measure verbal ability/achievement, nonverbal functioning, memory functioning, and quantitative abilities. One major shortcoming of such measures is that they ignore human cognitive processing. For instance, Weschsler scale is based on ability and achievement, not process (Rijumol et al., 2010). Therefore, Aleksandr Luria, a neuropsychologist, proposed a model of cognitive measurement, which is called the Luria Model. In this model the cognitive abilities are divided into three functional units. The first is the maintenance of arousal and attention level. The second one is coding. It controls the input, recalling and storing of information. The third and the last of them is planning. It refers to programming, regulating, and verifying the cognitive activities. What is unique in this model is that although each of these units in the brain is responsible for particular functioning, they must

function together as a whole to operate properly. They function simultaneously and in an interconnected way on many areas of the brain as a whole. Thus, the model contrasts to approaches which assume localization (Henmon, 1921).

Together with the advances in the theory of intelligence it is inevitable that there is a shift from abilities and achievement to information processing. 1960s witnessed the examination of higher order mental processes described as the "cognitive revolution." One of the first attempts to move to a more comprehensive cognitive measurement is the Kaufman Assessment Battery for Children (K-ABC). Actually, the measurement is based on the Luria Model and cerebral specialization. It examines simultaneous and sequential processing. Yet, it falls short in encompassing all human cognitive processes such as planning and attention (Das, 1992).

Later, Naglieri and Das went well beyond traditional views of intelligence and proposed a cognitive information processing model (PASS) based on the neuropsychological principles initially suggested by Luria (Naglieri, 1999). The PASS model involves planning, attention, simultaneous, and successive cognitive processes as the building blocks of intelligence. This model defines intelligence as the sum of all these cognitive processes. It has both a neurological and cognitive basis. The Cognitive Assessment System (CAS) is based on PASS theory. CAS is defined as an individually administered battery measuring the cognitive processes; planning, attention, simultaneous and successive processes suggested by PASS theory (Kranzler & Keith, 1999). It consists of 12 subtests each of which refers to the PASS cognitive processes.

The development of diverse intelligence tests, some of which are outlined above, is mainly a consequence of neuropsychologists' tendency to use them in their neuropsychological assessments. As Gansler suggest the results of neuropsychological test batteries and intelligence tests often reveal similar results. According to them, one possible reason of the correlation in the results may be "the rise of cognitive neuroscience approaches to the study of intelligence" (Gansler et al., 2017: 2).

Cognitive psychology emerged as a reaction to Behavioristic psychology and it focuses on the human mind and all aspects of the human information processing. Scholars claim that cognition involves many aspects such as "perception, attention, categorization, learning, and memory, thinking, decision making, problem solving, and language use" (Beller & Bender, 2010; Medin, 2004). In these respects, ERAL-NIT adopts a cognitive perspective.

Besides, it is known that intelligence tests aim to measure "cognitive abilities as opposed to irrelevant factors related to culture or language" (Hooper & Bell, 2006). Therefore, ERAL-NIT is developed as a culture-fair cognitive IQ test. However, there are many assumptions on the relationship between culture and cognition. Bender and Beller state that "[cognitive] processing is independent of context or people's cultural background" (Bender & Beller, 2013: 44). Despite the universal aspects of cognition, they claim that "people do not simply reason, they *learn* to reason" (p. 47). This means that other people in one's societal environment have an effect on the cognition of that person at least to some extent. They state that the cognitive processes affected by societal influences are broad, ranging from visual perception to spatial cognition. In a similar vein, it is highlighted the positive relationship between cognitive abilities and cultural effects (Haun et al., 2006). Boroditsky and Gaby in their study on the cognitive conception *time* demonstrate that it can differ across cultures (Boroditsky & Gaby, 2010). Beller and Bender investigate *numerical cognition* and the effects of culture on it (Beller & Bender, 2010) and explore the *spatial* and *temporal cognition* across different cultures and identify culture-specific preferences. Haun and his colleagues investigate *spatial cognition* across cultures (Haun et al., 2006). The results indicate a difference not only in preference but also in competence. In a similar study, the *spatial cognition* and find out that it varies across cultures (Majid et al., 2004). In another study (Masuda & Nisbett, 2006), *perception* and *cognition* was investigated and the findings reveal that there are cultural variations in basic perceptual and cognitive processes.

Norenzayan and Nisbett investigate culture and causal cognition and find differences in the cognitive abilities across cultures (Norenzayan & Nisbett, 2000).

Based on the findings of above given studies, it is clear that culture is inherently embedded in cognitive processes of individuals. To this end, ERAL-NIT aims to minimize its effect on the cognitive processes of individuals by not involving any cultural element in its items. That is, in order to make the intelligence scores to be as accurate and culturally fair as possible, the test items do not reflect any cultural elements.

ERAL-NIT is also affected by neurological brain-based studies. It is believed that the frontal, parietal, temporal and occipital lobes of the brain function in an interconnected way to operate as a whole and each of them is responsible for certain mental higher order processes. In the current study, the researchers have identified 16 subareas for those higher order executive functions; receptive language, gross motor movement, numeric ability, attention, convergent thinking, figure-ground perception, expressive language, fine motor movement, social ability, memory, divergent thinking, visual manipulation, concept knowledge, visual perception, reasoning ability, and part-whole relationship.

The literature suggests that receptive and expressive language is usually located in the left hemisphere, at the back part of the temporal lobe. Gross and fine motor movements include cerebellum (the development of fine motor skills plays a crucial role in school readiness). Frontal lobes control most cognitive functions. Reasoning ability and Numeric ability are located in frontal lobes, frontal lobes also appear to take charge of the brain's Attention ability, it controls relevant parts of the visual cortex, which receives sensory input. Temporal lobe region plays a major role in maintaining social ability. Memories are formed and stored in hippocampus, which is located in brain's temporal lobe. Hippocampus is also known to be responsible for creating and storing Concept knowledge. Occipital lobe is highly important in figure-ground perception, visual manipulation, visual perception and part-whole relationship. Parietal lobe region also plays a major role in these functions, it is the primary sensory area in which all of the sensory processing starts in the brain. It concerns primarily with the visual and spatial system. Divergent and Convergent thinking, the two processes central to cognition, refer to creative thinking and logical thinking respectively. It has been found out that there is close interaction between both hemispheres and the central parietal areas of both hemispheres are activated in those who display good performance in divergent thinking, and who use their imagination more effectively. Besides, convergent thinking is primarily right sided (Campbell & DeJong, 2005; *Stroke and cerebrovascular diseases*, 2019).

As can be seen, ERAL-NIT gives a clear profile of the cognitive capacity of the individuals.

ERAL-NIT also gives promising results in the identification of pervasive developmental disorder (PDD), specific learning disability (SLD), attention deficit disorder (ADD), and language use disorder (LUD).

1.2 *Justification for the study*

There are many reasons in developing ERAL-NIT; the first of them is that it is developed for individuals between the ages of 5 to 17. Especially in this age period individuals need guidance by their parents or teachers to reach their full potentials. ERAL-NIT serves as an effective measurement in this respect.

Additionally, although currently, many IQ tests are used in the world, most of these tests are verbal scales (Weschler 5, CAS, etc.). This may create a problem for the participants who are not literate or who cannot use the language in an effective way. Moreover, the rise in the

number of individuals from diverse cultural and linguistic backgrounds mainly because of the minority groups and immigrant population in all over the world create a need for nonverbal intelligence tests to provide fair assessment. To overcome this problem ERAL-NIT is a nonverbal test. Naglieri and Prewett suggest that in order to make a nonverbal intelligence test accurate and valid, it has to give a complete description of the cognitive processes of individuals who display physical limitations, language disorders, etc. as comprehensive as those of normal individuals (Naglieri & Das, 1990). In this respect, ERAL-NIT can be considered as valid and accurate since its results are also parallel with diagnoses such as PDD, SLD, ADD, and LUD.

Besides, ERAL-NIT does not merely evaluate individual performance of the participants. It also investigates parental evaluations and compares them with the child's overall performance. This gives way to parents to evaluate the accuracy of their own insights about their children. This allows the child to grow up in a healthier environment. As an initial step, parents state their own insights about general and more specific performance-based characteristics of their children (this takes maximum five minutes). At the end, in the light of the findings received from ERAL-NIT, it becomes clear how consistent the parents are in their evaluations about their children. The test shows parents whether their evaluations for the child's specific and general performances are compatible. The test compares the actual performances of the children with the parental evaluations on a chart and if there is any inconsistency, the test enables practitioners to make some suggestions for the parents.

Another reason beneath the need for the development of such a test is that unlike its many counterparts, ERAL-NIT takes rather a short period of time to conduct; approximately 25 minutes. This is especially important since it also encompasses early age groups who do have rather short attention spans.

It is a known fact that no matter how high the intercoder reliability of such tests, there is always a risk for mistakes emerging from practitioners. To minimize such problems, ERAL-NIT has been developed to be implemented on a tablet as a software program, which makes most of the data entry itself and provides a detailed report on the performance of the participants at the end of the evaluation process.

Furthermore, the conduction of ERAL-NIT does not require a clinic atmosphere and the participants who take this test do not feel a sense of failure.

Finally, most tests evaluate the individuals' performances at a particular time ignoring all the other possible factors such as feeling of hunger, security, etc. However, during the process there are many factors which may have an effect on the individuals' performance. Intelligence or mental capacity cannot be measured thoroughly by just focusing on what the individual can do within a certain time by himself or herself. In this vein, ERAL-NIT takes all these factors into consideration; the practitioners first observe the behaviors of the test takers (restless eye movement, shaking hands, swinging head, and body, etc.) and may ask some specific questions to the parents such as "Is she/he hungry?", "Is she/he tired?" etc. These observations and the responses they gathered have minimum effect on the total findings of the test.

1.2.1 *Purpose of the study*

The purpose of this study is to develop a neurocognitive IQ test for Turkish young people between 5 and 17 years old, and to investigate its validity by comparing the scores on that test with the scores on another well-known IQ test; CAS. In short, it is aimed to share the development process of this new test; ERAL-NIT and initial validation endeavors with researchers and practitioners. It is assumed that psychiatrists, psychologists, child development experts, and psychological counselors in advising families, and school age children and teenagers will use information from this study.

1.2.2 *Research questions*

To what extent is there evidence to support the content validity of ERAL-NIT (in the Turkish context)?

To what extent is there evidence to support the criterion validity of ERAL–NIT (in the Turkish context)?

2. Method

2.1 *Participants*

ERAL-NIT is developed using a nationally representative sample of 642 participants between the ages 5 to 17. Examinees in the sample are selected from 12 regions determined by the Turkish National Institute of Statistics' classification of statistical regional units. By this way, it is believed that the sample is representative of the general population. One city in each of these regions is chosen as the representative. Thus, a total of 12 cities are determined. Both the private and state school students in those cities are invited to join the research. Five schools are randomly selected in each city. Table 1 shows the frequencies of participants by cities.

Table 1. Frequencies of participants by cities

Cities	**F**	**% of Total**	**Cumulative %**
BURSA	82	12.8 %	12.8 %
SAMSUN	64	10.0 %	22.7 %
TRABZON	28	4.4 %	27.1 %
ANKARA	63	9.8 %	36.9 %
İSTANBUL	110	17.1 %	54.0 %
ANTALYA	82	12.8 %	66.8 %
GAZİANTEP	67	10.4 %	77.3 %
SİVAS	24	3.7 %	81.0 %
TEKİRDAĞ	34	5.3 %	86.3 %
İZMİR	41	6.4 %	92.7 %
MALATYA	30	4.7 %	97.4 %
ERZURUM	17	2.6 %	100.0 %

A stratified random sampling is used to select participants so that the size of the sample is proportional to the number of participants from age 5 to 17 in the population. Table 2 reveals the frequencies of participants by ages. The age distribution of the sample has a mean of 10.73 with a standard deviation of 3.60.

Table 2. Frequencies of participants by ages

Age	F	% of Total	Cumulative %
5	53	8.3 %	8.3 %
6	48	7.5 %	15.7 %
7	47	7.3 %	23.1 %
8	65	10.1 %	33.2 %
9	36	5.6 %	38.8 %
10	47	7.3 %	46.1 %
11	66	10.3 %	56.4 %
12	77	12.0 %	68.4 %
13	46	7.2 %	75.5 %
14	37	5.8 %	81.3 %
15	32	5.0 %	86.3 %
16	52	8.1 %	94.4 %
17	36	5.6 %	100.0 %

The number of participants reveal a balanced distribution in terms of gender. While 50.47% (n=324) of the participants are male, remaining 49.53% (n=318) are female.

Out of the total number of the participants parents of 574 are involved into the study. Before the conduction of the test, parents are asked to state their evaluations about their children's general and specific performances. Their comments are compared with the findings gathered from ERAL-NIT. Finally, apart from these, another group of 243 participants who have hospital diagnoses with SLD, PDD, LUD, and LA are also enrolled into the study.

2.1.1 *Instrument*

In this study the Cognitive Assessment System (CAS) is used to ensure the criterion validity of ERAL-NIT. The standard CAS battery consists of 12 subtests. The PASS processes are reflected in four scales and their respective subtests: Planning, Attention, Simultaneous, and Successive. A standard score is provided for each cognitive process along with a full-scale score. The internal reliability coefficients are high, Planning=.88; Attention=.88; Simultaneous=.93; Successive=.93; and Full Scale=.96 (Das et al., 1994; Naglieri, 1999).

Besides, the hospital diagnoses for SLD, PDD, LUD positive individuals are used to increase criterion validity of ERAL-NIT.

2.2 *Procedures*

2.2.1 *Development of ERAL-NIT*

As an initial step an approval is received from the research ethics committee from a state university. Before starting the development of ERAL-NIT, a group of 36 experts, including psychiatrists, psychologists, psychological counselors and child development specialists is asked what kind of a test is needed in the field of intelligence testing. The answers received from them are analyzed using Content Analysis Method and some features of ERAL-NIT are decided accordingly. As a result of expert opinions, it is decided that the test is non-verbal, it is a software program applied on a tablet, does most of the scoring, and the report itself, it does not include cultural elements, it is applied in a short time, it gives results about pervasive developmental disorder, special learning difficulty, attention deficit disorder, and language use disorder and it involves families.

The other stage is the generation of the items. With the help of 18 experts (three experts from the field of child development, three experts working in the field of test development, three psychologists, three psychological counselors, three psychiatrists, and three neurologists), items are generated in line with the neurological brain-based studies. By this way the content validity of the items is ensured. "Drawing a picture in which there is a human being, a tree, etc.," and "finding the rote to exit in a labyrinth" are some of the items in the test. These items provide raw score for the 16 sub areas for the higher order mental processes given before, for the total IQ score, and for the frontal, temporal, occipital and parietal lobe areas. The raw score is calculated based on the abilities of different ages stated in the related literature. The literature depicts what a normally developing five-year old's mental capacity can do, the raw scores are determined in parallel to these arguments. However, if the child performs better than expected she/he receives a higher raw score. In a similar vein, if the child's performance is below her/his age she/he receives a lower raw score. The IQ score, the scores for frontal, temporal, occipital, and parietal lobe areas and the scores for the 16 subareas of brain's mental functioning are calculated by the multiplication of the coefficients and these raw scores. It should be noted that the brain a unique organ and no matter the areas in the brain have certain functions they need to work as a whole, in a parallel way to operate thoroughly. Thus, all the raw scores have an effect on IQ score, the scores for the four lobe areas and the scores for the 16 subareas of brain's mental functioning via the coefficients.

Then, in order to calculate each sub-domain score, the coefficients of each item on the basis of sub-domains are first determined by the researchers, then the coefficients are revised by taking the opinions of five experts online with the Delphi method about the appropriacy of the item coefficients. The revised coefficients are again reviewed individually by the experts; for the coefficients that cannot be reached on a consensus, the arguments of the experts who have different opinions are sent to the other experts. Finally, the interviews among the experts go on until a consensus on the coefficients is provided and the coefficients are thus finalized. The same procedure is followed in order to calculate the score for the parietal, frontal, temporal and occipital lobes and the IQ score. At the end of this process, according to the expert opinion of the test to be measured, content validity is provided, and evidence is collected for the construct validity.

The practitioners use observation checklists to understand the appropriacy level of the participants before starting the process. The items in the checklist include body language of the participant (for exp; eye movements, shaking hands, etc.). It also involves some specific questions for the parents about their children (for exp: the level of hunger, tiredness, etc.). Finally, the checklist involves items related to the physical environment the test is conducted in (for exp: the lightening, the background noises, etc.). Research suggests that all these factors may have an effect on the performance of the participants (Afridi et al., 2019; Kraft et al., 2016).

The criterion validity studies of ERAL-NIT are ensured via CAS regarding attention and hospital diagnoses on SLD, PDD, and LUD. Apart from this, eight school counselors apply the two tests: ERAL-NIT and CAS to 642 participants. They use a detailed application manual prepared by the researchers and send the data to the researchers by mail. Criterion validity of ERAL-NIT is ensured by comparing the general IQ scores obtained from ERAL-NIT and CAS in this way.

Parents of 574 of these participants are asked to state their evaluations about general and more specific performance-based characteristics of their children. To this end, a five-point Likert type questionnaire is used. The items in the questionnaire are determined by asking the opinions of five experts. The researchers use the same Delphi method to score the items in the questionnaire. The data gathered is used to see whether parental evaluations are consistent within themselves. Besides, the researchers compare parents' evaluations with the actual performances of their children and investigate any possible consistency and/or discrepancy. The benefit of using such a method is to facilitate the accuracy of the feedback given to parents about their children.

Apart from those 642 participants, 243 participants diagnosed with SLD, PDD, LUD, and ADD are also enrolled into the study. The aim is to increase criterion validity of the test by comparing the hospital diagnoses and the findings gathered from ERAL-NIT and to reveal to what extent the findings of the test support the hospital diagnoses. The findings of ERAL-NIT and hospital diagnoses are compared to increase the validity of the test. However, since the number of the individuals who have diagnosed for ADD in hospitals is just four, not enough for valid statistical processing, ERAL-NIT's findings for attention are compared with CAS' findings.

3. Findings

Below is given the descriptive statistics results of the development of the ERAL-NIT.

Table 3. Descriptive statistics of ERAL-NIT scores (with and without observations) and CAS scores

	IQ_I*	**IQ****	**TP (CAS)*****
Mean	101.739	103.898	104.095
Std. error mean	0.513	0.517	0.525
Median	101.621	104.392	105.000
Standard deviation	13.003	13.106	13.295
Minimum	48.533	48.533	46.000
Maximum	141.231	141.231	139.000
Skewness	-0.119	-0.189	-0.330
Kurtosis	0.520	0.528	0.459

* Initial IQ_I (without considering the psychologist's observations)
** IQ scores after taking the effect of observations
*** CAS scores

Figure 1. Distributions of ERAL-NIT scores
(with and without observations) and CAS IQ (TP) scores

	Group	N	Mean	Median	SD	SE
ERAL-NIT IQ	M	324	102.67	103.15	13.59	0.76
	F	318	104.98	105.21	12.47	0.70
CAS IQ	M	324	103.03	103.00	3.96	0.78
	F	318	105.07	106.00	12.50	0.70

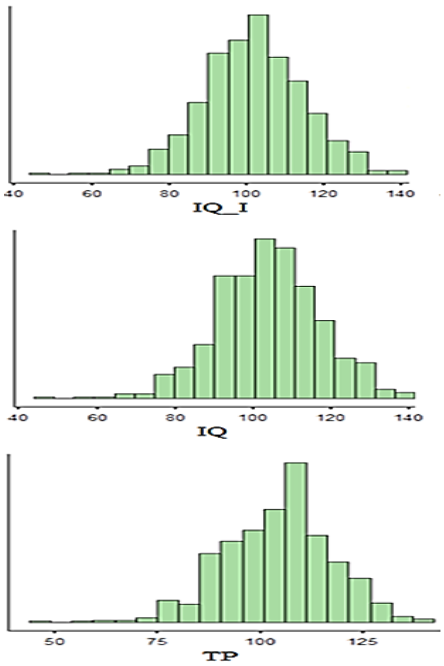

Table 3 and Figure 1 show that IQ scores without considering the practitioner's observations, IQ scores after taking the effect of observations and CAS scores have very similar descriptive statistics in terms of their means, standard deviations, skewness, kurtosis values; however, IQ scores' statistics after taking the effect of observations are closer to the CAS scores' statistics than that of IQ scores without considering the practitioner's observations. Pearson correlations among the three measurements indicate that although initial IQ scores without considering the practitioner's observations have a strong positive correlation with CAS scores, the relation between IQ scores after taking the effect of observations and CAS is stronger.

Table 4. Correlation matrix depicting the comparison of ERAL-NIT scores
(with and without observations) and CAS scores

	IQ_I	IQ	TP (CAS IQ)
IQ_I	—		
IQ	0.97*	—	
TP (CAS IQ)	0.87*	0.91*	—

* $p < .001$

Based on the descriptive statistics and the correlation matrix given in Table 4, the researchers decide to utilize IQ scores after taking the effect of observations and corresponding sub-scores for the rest of the study.

Before doing ERAL-NIT and CAS comparison, a test of normality is conducted on ERAL-NIT and CAS scores. Shapiro Wilk statistics ($p<.05$ for ERAL-NIT and $p<.01$ for CAS) indicate that both variables have non-normal distributions.

Table 5. Descriptive statistics of ERAL-NIT and CAS by gender

	Group	N	Mean	Median	SD	SE
ERAL-NIT IQ	M	324	102.67	103.15	13.59	0.76
	F	318	104.98	105.21	12.47	0.70
CAS IQ	M	324	103.03	103.00	13.96	0.78
	F	318	105.07	106.00	12.50	0.70

Table 5 suggests that ERAL-NIT and CAS scores have similar descriptive statistics for both genders. The two scores for males have slightly lower mean and median and higher standard deviations.

Figure 2. Graphical representation of ERAL-NIT and CAS(TP) scores by gender

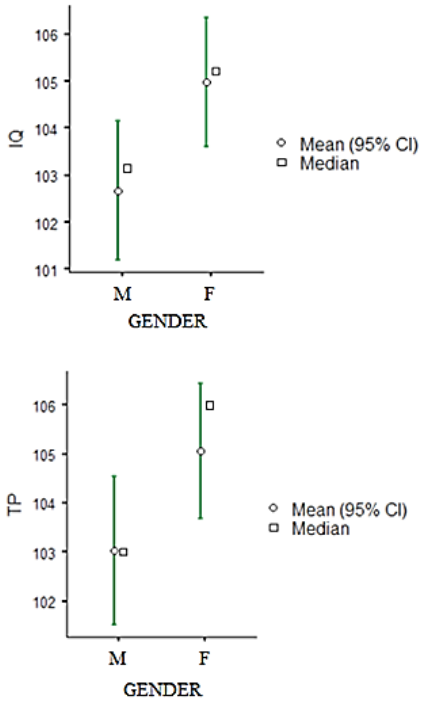

Figure 2 represents the differences on both test scores by gender. Based on the Mann-Whitney test results, it is concluded that the differences in IQ ($U=45874$; $p<.05$) and CAS ($U=46601$; $p<.05$) scores are significant in favor of girls. This finding is in line with some of the

studies in the literature. Palejwala et al. (2015) in their study related to gender differences and cognitive abilities find a female advantage for children aged 2-7. In a similar vein, Keith et al. (2008) in their study related to sex differences and latent cognitive abilities suggest that females show a consistent advantage on latent processing speed.

Table 6. ERAL-NIT positive and negative findings among those diagnosed as SLD positive by the hospital

Level	Count	Total	Proportion	P
POSITIVE	80	81	0.98	< .001
NEGATIVE	1	81	0.02	< .001

Table 6. shows the binomial test results on the SLD positive participants based on the tests conducted by the hospitals. Results reveal that the proportion of participants identified SLD positive by the ERAL-NIT is significantly higher than the proportion of the participants identified SLD negative. 83% of the SLD positive participants based on the hospitals' diagnostics are identified as SLD positive by ERAL-NIT. In addition, as seen in the contingency table below, an analysis of the frequencies regarding the participants with special needs per hospital records are generally matching with the diagnosis by ERAL-NIT. An attention drawing finding is that the 98% of SLD positives in terms of ERAL-NIT scores are identified as having other diagnosis such as language use disorder.

Table 7. Frequencies of ERAL-NIT and CAS in terms of ADD

ERAL-NIT ADD		NEGATIVE	POSITIVE	CAS ADD
NEGATIVE	Observed	527	28	555
	% within column	92 %	39%	86 %
POSITIVE	Observed	43	44	87
	% within column	8 %	61 %	14 %
Total	Observed	570	72	642
	% within column	100 %	100 %	100 %

Table 7. suggests that, 92% of the 570 participants who are ADD negative according to CAS are also ADD negative according to ERAL-NIT. 44 (61%) of the 72 participants who are ADD positive for CAS are also positive for ERAL-NIT. On the other hand, 28 participants who are ADD positive for CAS are negative for ERAL-NIT and 43 participants who are ADD negative for CAS are positive for ERAL-NIT. In short, CAS and ERAL-NIT results are very similar in detecting negatives, but the rate of obtaining similar results in determining positives decreases. A Chi-Square test revealed that there is a statistically significant relationship between the findings of ERAL-NIT and CAS in terms of ADD (χ^2 =156.58 (1); p< .001). These findings related to ADD also support the criterion validity of ERAL-NIT.

Table 8. ERAL-NIT positive and negative findings among those diagnosed as PDD positive by the hospital

Level	Count	Total	Proportion	P
POSITIVE	28	31	0.903	< .001
NEGATIVE	3	31	0.097	< .001

As Table 8 suggests, out of the 31 participants who are diagnosed as having PDD in the hospitals, 28 (90.3%) are identified as PDD positive by the ERAL-NIT. The correlation between them is statistically significant (P<.01).

Table 9. ERAL-NIT positive and negative findings among those diagnosed as LUD positive by the hospital

Level	Count	Total	Proportion	P
POSITIVE	82	89	0.921	< .001
NEGATIVE	7	89	0.079	< .001

As Table 9 depicts, out of the 89 participants who are diagnosed as having LUD in the hospitals, 82 (92.1%) are identified as LUD positive by the ERAL-NIT. The correlation between them is statistically significant.

Finally, as expressed before, parents are asked to assert their evaluations about what their children can perform in general and specific areas. A five-point Likert type questionnaire is used for this. Appendix A reveals the reliability of the questionnaire.

Table 10. Descriptive statistics of the IQ scores received from CAS, ERAL-NIT, and parental evaluations for children's general and specific performances

	CAS IQ	ERAL-NIT IQ	PARENTS' G*	PARENTS' S**
Mean	103.82	102.63	111.61	117.20
Median	105.00	102.58	113.47	119.79
Standard deviation	13.39	13.03	22.15	21.31
Minimum	46.00	48.36	31.67	38.18
Maximum	134.00	137.86	206.31	169.75
Shapiro-Wilk W	0.99	0.99	0.99	0.97
Shapiro-Wilk p	< .001	0.043	< .001	< .001

* IQ score for parental evaluations for children's performances in general
**IQ score for parental evaluations for children's performances in specific areas

Table 10 reveals descriptive statistical data gathered from 399 participants. It can be clearly seen that, means of parental evaluations for children's performances in general and specific areas and standard deviations are significantly higher than those of ERAL-NIT and CAS. This finding is in parallel to the literature. The literature on parents' beliefs about the intelligence of their children mainly suggest that parents believe their children are significantly brighter than they are, this means both parents have a tendency to overestimate their children's IQ (Chamorro-Premuzic et al., 2009; Furnham et al., 2002). Parental evaluations are considerably important since they affect how children are treated. Knowing what their children can do or cannot do plays a crucial role in having a healthy relationship among the members of the family.

Besides, according to the Shapiro-Wilk normality test, four variables do not have normal distribution. Thus, the Spearman Brown correlation coefficient is calculated. Table 11 shows the results.

Table 11. The Correlations between IQ scores of CAS, ERAL-NIT, and Parental Evaluations for Children's General and Specific Performance

	CAS IQ	ERAL-NIT IQ	PARENTS' G	PARENTS' S
CAS IQ	—			
ERAL-NIT IQ	0.80***	—		
PARENTS' G	0.28***	0.27***	—	
PARENTS' S	0.23***	0.18**	0.64***	—

*** p < .001

The above Table 11 reveals that data received from both ERAL-NIT and CAS has statistically significant positive but weak correlations with the parental evaluations for children's performances in general and specific areas.

4. Discussion

This study aims to develop and validate ERAL Nonverbal Intelligence Test. It is developed within the Turkish context. The content validity of the test items is ensured by asking the opinions of 18 experts from the fields of psychology, psychiatry, test development, child development, psychological counseling and neurology. The experts suggest what individuals can do between the ages 5 to 17 under the light of related literature. The coefficients are identified via the Delphi Method. The multiplication of these coefficients with the raw scores gives the IQ score, the scores for frontal, temporal, occipital and parietal lobe areas and the scores for the 16 subareas of brain's mental functioning.

The other equally important part of test development is ensuring the criterion validity of the test. To this end, the researchers compare the findings of ERAL-NIT with another well-known IQ test; CAS in a number of ways. Firstly, the IQ results gathered from ERAL-NIT are compared with those of CAS. The results suggest a statistically significant correlation between the findings of these two tests. Besides, it should be noted that when the observations of the practitioners are included in the evaluation, there appears to be an increase in the correlation between the ERAL-NIT's results and CAS' results. Secondly, the two tests are compared in terms of gender. Both of the findings are found to be compatible and in favor of girls. Finally, ERAL-NIT's findings for ADD are compared with CAS' findings. The results again suggest a positive correlation between these two tests in terms of ADD.

The other evidence for the validity of ERAL-NIT emerges from the comparisons of the findings of ERAL-NIT with the hospital diagnoses for SLD, PDD, and LUD. The findings reveal statistically significant positive correlations between these diagnoses and the findings of ERAL-NIT.

The fact that parental evaluations for children suggest a statistically significant relationship with the IQ scores of ERAL-NIT and CAS indicates that ERAL-NIT is a valid measurement tool.

Based on the above given data analyses and the findings, it can be concluded that ERAL-NIT is a valid and comprehensive cognitive IQ test which has its roots in brain-based science. It has many implications for educators, psychologists, psychiatrists, psychological counsellors, and child developmental specialists:

It is a nonverbal IQ test developed for 5 to 17-year-olds;

It reveals participants' cognitive functioning in a comprehensive way, and gives complementary suggestions for the areas that need to be developed;

The software system enables practitioners give feedback and report immediately after the application;

The software system decreases the practitioners' possible mistakes during the application;

It takes approximately 25 minutes, which means it is quite practical to use;

It involves parental evaluations for their children's general and more specific performances;

It helps parents treat their children more accurately, and keep more healthy relationships with their children;

It guides practitioners identify participants with Specific Learning Disability, Pervasive Developmental Disorder, Lack of Attention and Language Use Disorder.

In conclusion, ERAL-NIT suggests a great potential and may serve as an effective alternative to other IQ tests. Yet, it should be noted that further studies need be conducted. In this vein, it is recommended to apply ERAL-NIT on larger groups of people and evaluate the results accordingly. It is also suggested that similar to parental evaluations it can also be used to understand the accuracy of teachers' evaluations with regard to their students. This may help them have a better idea about their students and their capabilities.

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Cognitive, Affective and Behavioral Attitudes in English Language Learning

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Abstract

The process of any language learning is a complex construction of objectives. Any goal is influenced by internal or external factors such as motivation, culture, previous experiences, attitudes, etc. This study aims to recognize and understand the distinct learners' attitudes during their learning progress. This research is conducted as a case study. The inquiry tool for its mediation is an interview. The interview was directed in a face-to-face modality to collect and discuss the obtained results. In this study, positive and negative language attitudes of five English learners from a Language Department. Furthermore, the findings show that the learners share similar perceptions, attitudes, and experiences in their learning processes. The relevance of the findings contribute to the pedagogical implication in an EFL classroom happens.

Keywords: language learning attitudes, cognitive attitudes, affective attitudes, behavioral attitudes.

1. Introduction

Language learning attitudes are a vital dimension to understanding the language learning process (Dogan & Tuncer, 2020). In the EFL context, the attitudes can modify the learners' perceptions towards the learning and the language itself. Also, language attitudes can determine distinctive affections that bring beneficial or nonbeneficial learning outcomes. With these outcomes, learners' attitudes can be negatively or positively affected, and they bring strategies to reach their learning objectives (Rahman, Jalaluddin, Kasim & Darmi, 2021).

This study aims to identify the language learning attitudes of university students in their English language process. The derived findings of this study are efforts to contribute to the EFL field. The contribution explores diverse and similar points of view toward English learning. And how it affects their language competence. It is crucial to highlight the focus of this study; it is based on exploring and understanding attitudes in its three dimensions: cognitive, affective, and behavioral.

To conduct the study, I will first provide a brief literature review of prime concepts such as attitudes and their three dimensions. Then, I present the methodology I followed to conduct the investigation. And I provide the obtained results with its critical discussion. Finally, I offer a conclusion concerning the results.

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2. Literature review

2.1 *Language learning attitudes*

The following section will address the theoretical framework of this study. The information below will have a relevant role to understand and comprehend the determined cases in the study.

According to Garrett (2007), an attitude refers to the pleasant or non-pleasant disposition towards a situation, object, or agreement. Also, an attitude can make someone act towards something (Le & Le, 2022). An attitude within the field of language learning is the tendency to act positively or negatively toward the aspects that involve any language learning (Zulfikar, Dahliana & Sari, 2019). The pleasant or positive attitudes in the language learning process improve the English language outcomes, while the negative ones affect the process because of failure (Le & Le, 2002). These authors exposed a relevant fact about an attitude. It is individual. When attitudes arise in a question, the study object will focus on one single individual performance, for example, what the individual thinks about the English language or how the individual perceives the language. Also, the attitudes are mainly associated with behaviors because of the definition these authors provided. Ahmed (2015) expressed that attitudes in language learning are feelings, beliefs, and behavior tendencies towards the language learning. In addition, attitudes have a "tripartite structure" (Garrett et al., 2003: 3). Attitudes involve three relevant dimensions: cognitive, affective, and behavioral components.

2.2 *Cognitive, affective, and behavioral attitudes*

Cognitive attitudes refer to the beliefs about the context it is around (Garrett, Coupland & Williams, 2003). Also, the cognitive dimension is associated with the ideas or opinions of something (Zulfikar et al., 2019). Dogan and Tuncer (2020) stated that this dimension tends to be complex to describe. They exposed that cognitive attitudes consist of thoughts and knowledge of an individual to a particular object. However, a relevant fact about this dimension is that it can be shaped and modified. According to Garrett (2007), the cognitive component is highly influenced by societies. The stereotypes influence the point of view of that object. In language learning, the dimension comprehends the perception of the language itself and the situation where it is involved in the language.

The affective component is also known as the emotional dimension. It refers to the experienced feeling toward something (Zulfikar et al., 2019). Also, the negative and positive dispositions are the principal affective attitudes it can be found in a situation (Dogan & Tuncer, 2020). These authors stated that the emotional dimension within language learning is the acceptance of the language itself, the teacher or class, or vice versa. They presented relevant affective factors in which individuals may have different attitudes. The most meaningful factor is the English as a Foreign Language (EFL). What the individual feels about language learning in an environment where the target language is not around can lead to acceptance or not the learning. The following factor is related to the personality. When the individual possesses a capacity to be social, actively participate, and take risking skills is more likely that the individual constructs a positive attitude toward the language. The final factor is the social impact. It is constructed due to the language role in current societies.

The behavioral dimension is characterized by the individual's action towards something (Dogan & Tuncer, 2020). In language learning, the learner's action is meaningful to identify a positive or negative attitude toward the learning process. Furthermore, the behavioral component links to the decision-making of the individual. The different actions learners execute affect positively or negatively to their language performance.

In general, the three components are vital to the understanding of the learning process and performance of an individual. Rott (2002) offers the interrelation of the three dimensions of attitudes (as cited in Daggol, 2017: 258). He stated that thoughts (cognitive attitude) affect (emotional attitude) behaviors (Daggol, 2017). Also, it can be seen from another perspective. For example, behaviors affect thought. Or the emotions affect thoughts and behaviors. All three components are connected, and they can determine an attitude.

3. Methodology

As a main objective, I want to know their perspectives and beliefs, and what they think about learning English as a foreign language according to the different needs of their belonging studies contexts. Therefore, the research question is:

> What are the attitudes of the university students towards English language learning in the Language Department at the University of Guanajuato?

The study required the attitudes identification towards learning situations of English learners. Therefore, the study is qualitative because it looks at learner's attitudes and understanding. The qualitative paradigm highlights the distinctive daily life events to give a meaning or explanation (Muzari, Shava & Shonhiwa, 2022). The learning attitudes are constructed according to the diverse scenarios and events the participants lived when learning English. One of the purposes of using a qualitative paradigm is to understand those experiences people have. And as a researcher, those experiences and units of meaning generate theories (Kamal, 2019).

According to Hood (2009), a case study focuses on one single character such as school, student, institution, or organization. In this study, the subject matter are the learning attitudes of different English learners. The author stated that an intrinsic case study focuses on understanding a distinct event that does not generalize to others. In this study, the participant experience is not generalized to the rest of the cases and is far from other studies. Also, according to Heale and Twycross (2017), a case study could have different cases on one single issue. It is case study research and highlights the differences and similarities between the events. In this case, participants' experiences are compared as a multiple-case scenario.

3.1 *Context and participants*

The context where the study took place was the city of Guanajuato. The study was developed in the English language department of the University of Guanajuato. To conduct the study was necessary to find five students with an intermediate progress inside the institution.

The participants for this study were five men. Three of them were 22 years old, and two were 23 years old. The similar characteristics they have are they are Mexican, they study BA programs at the University of Guanajuato, and they learn English as a foreign language at a 400 level at the language department of the University of Guanajuato. Three participants have been studying English since middle school stage as a subject in the grade. Two participants had their first English learning contact in the language Department. According to their bachelor programs, three students belong to the Architecture program, one studies Civil Engineering, and one studies Computational Systems. The participation was voluntary, and participants were required to sign a consent form in which they were aware of their rights to participate, to withdraw their participation any time, and that their identity was protected.

3.2 *Instrument*

According to Talmy (2010), interviews are used for qualitative studies about beliefs, perceptions, and experiences of a situation. This study attempts to know the attitudes of English learners. As the main purpose of the study is to work with people, the interviews allow us to collect the perceptions regarding what people have experienced and how the phenomena to study could impact them (Buriro, Awan & Lanjwani, 2017). It was necessary to have flexibility within the interview to ask for more information and clarification. A semi-structured interview allows one to ask more questions than those already structured (Ruslin, Mashuri, Rasak, Alhabsyi & Syam, 2022). I designed a semi-structured interview because I wanted to know the experiences while learning English. I applied the interview first by looking for intermediate students in the language department who were able to answer a face-to-face interview. When the interview took place, I recorded the voice to be transcribed after. The conducted interview was in Spanish, but the responses were translated into English for the data analysis.

3.3 *Data processing and analysis*

This study followed a thematic analysis. According to Braun and Clarke (2012), thematic analysis refers to a method for qualitative studies. This analysis involves the interpretation of qualitative sources from part of the researcher (MacQueen & Namey, 2011). These authors stated that the collected data identifies a sector called “themes” and later “codes”. Codes show the most meaningful and relevant data (Braun & Clarke, 2017). One of the best advantages that thematic analysis has is the appropriate and less effort management of the complex source of data (Guest et al., 2011). The collected data is processed in two different levels: macro and micro. The procedure of the macro consisted of the collection of relevant data for the study. Then, the data is coded with an initial theme connected with literature. Then, a final interpretation expounds what participants expressed without changing the meaning. And a final identification of the data. The micro level consisted of the defined code and the interpretation. Then, the identification that corresponds to the units of meaning within the code. In this study, I processed one macro-level table for each participant.

4. Results

The data collected from the interview revealed vital information about student’s attitudes toward English language learning. The discussion the results will be divided into the three types of existent learning attitudes: cognitive, emotional, and behavioral.

4.1 *Cognitive attitudes*

The information gathered related to cognitive attitudes was coded into two themes: Beliefs of the importance of English in their contexts, and students’ reason for learning English. The information below states the data and its discussion.

4.1.1 *Beliefs of the importance of English in their contexts*

The interview responses showed that all the participants consider English as a fundamental language and tool for their professional fields and working contexts. Two participants expressed the following:

> It is important in the academic, university and work environment because you can get a better job with a good salary and have a better life in the future (DL_1).

> Job opportunities, getting foreign clients or working abroad, travel and tourism facilitator within the architectural profession (FP_1).

These quotes represent that English is important to gain access to a better job and life. The participants showed a positive attitude toward the English learning. They attribute a possible effective professional development thanks to the language. Also, most of the participants consider that English is a vital tool to communicate, as follows:

> Language remains fundamental, access to information and education is widely used within the architectural community, as many publications, books and research are only available in English (FP_1).

> From the fact of socializing and getting to know new places or people is like my objective or the context in which I would like to be (DR_1).

The data indicates that English allows the opportunity to communicate and understand contexts where the participants aspire to be. Within their working fields, the participants expressed the use of sources of information they need to read and work on. The participants keep a positive perspective for learning English due to the wide opportunities where they can use the language as a communicative facilitator. The importance of English learning employs the personal reasons why the participants study the language.

4.1.2 *Students' reasons for learning English*

The results showed most of the participants believed English gives a great gate to information and skills they will use in their professional fields, for example:

> It is fundamental for my academic and professional development and gives me the possibility to connect with people and information resources around the world (FP_2).

> In addition, it is a fundamental requirement for jobs that are about my career (CG_2).

The information represents the facility the participants will have to work in different contexts using the language. This facility creates a positive perspective about the language learning, because for the participants it is crucial to connect with people around the world. The objective of connecting and establishing communication abroad is reached with the language. Also, most of the participants expressed English as a universal language, and it makes it attractive to learn, as follows:

> It is because I have always had the intention of learning another language, and English is the universal language (CG_2).

> I am very interested in it, I like that thanks to it we can communicate almost everywhere in the world (JC_2).

The data collected suggests that one of the main reasons to learn English is for the language position in the world. Participants get motivation due to the fundamental role of English in many places in the world. Furthermore, the participants expressed that learning another language was part of their personal goals. Also, all the participants agreed that the main reason why they are studying English at the Language Department is to fill the academic credits and they can graduate from their programs, as follows:

> The fact that I am studying architecture requires me to take at least six levels of English (DR_2).

> I have to accredit level six in order to graduate (DL_2).

These two quotations attribute English learning to an academic outcome. The interview results of this section suggest the reasons for studying English are mainly associated with academic and professional fulfillment in the University of Guanajuato.

4.2 *Emotional attitudes*

The collected data for emotional attitudes was coded in one major category: feelings in learning English. It is presented below.

4.2.1 *Feelings in learning English*

The participants in the study showed emotions of frustration and stress during an intermediate stage while learning English. The majority of the participants felt that English turns more difficult when levels progress. For example, two of them expressed the following:

> At first it was light, as the levels went on it became interesting, but it stressed me out at times (DL_3).
>
> I have had a mixture of emotions. First the enthusiasm to start learning it and then comes the hard part which is the frustration (FP_3).

The data indicated that the participants experienced a series of stressful situations when they started to learn more English. It can be suggested that a process which is in constant knowledge accumulation is difficult when it progresses. Also, other participants commented on the same responses, as follows:

> During the stage where I felt that I was already learning the language, it was frustrating, because I was less able to understand all the topics (DR_3).
>
> It is stressful, because you are not going to remember all the things and topics at the same time (CG_3).

These quotes showed that with more English language knowledge, it is more difficult to retain information, and apply the language. By feeling frustrated, they show a negative emotional response toward the English learning process. However, two participants welcomed the opportunity to focus on a positive emotional response. They reported the following:

> Sometimes the satisfying moments come because you start to see the progress you are making (FP_3)
>
> And now I feel more motivated. I feel happy because I understand more words and I am more encouraged to speak it (CG_3)

Even though most of the participants experienced a negative feeling while learning English, they also experienced satisfactory moments when they realized their English language progress. Taking together both feelings, the study suggests an association between positive and negative responses toward English learning. It can be inferred that the English learning process produces negative emotions, while the learning result produces positive ones.

4.3 *Behavioral attitudes*

Behavioral attitudes were categorized into two main themes: effective language learning strategies and self-schedule to learn English. The data is presented below.

4.3.1 *Effective language learning strategies*

In exploring the behavioral student's attitudes, it was found similar effective strategies during their learning process. All the participants indicated the use of multimedia to learn English, for example:

> With apps, movies, music in English, podcasts that you find in Spotify (FP_4).
>
> 80% of the content I consume is in English, e.g. memes, videos, movies, series, readings, school research (JC_4).

The information indicates a positive use of multimedia to learn English. Also, it can be suggested that the use of different sources for practicing English is a motivating factor. They stated that these strategies are used for daily life, and the strategies allow extensive contact with the language and a better performance with their formal learning, as follows:

> I started reading and doing exercises (DL_4).
>
> Going to the self-learning center because the teachers are there all day, and it helps me to practice my skills and on the other hand entering the language department (JC_4).

The data can be thus suggested that formal English learning with language learning strategies for daily use has a positive and motivating impact on the student's performance. The participants may keep a positive attitude towards negative feelings, such as stress while learning while learning English. Also, the combination of both types of learning can help them balance the unfavorable reactions.

4.3.2 *Self-schedule to learn English*

Final information obtained from the interview was the formal learning of each participant. The responses are addressed in relation to the previous theme of effective learning strategies. All the participants agreed with the five hours in the Language Department of the University of Guanajuato. In addition, most participants reported the following information:

> In the self-study center six hours (JC_5).
>
> And coming out of my classes when I have time, or on weekends I study one hour on Saturday and another one on Sunday and I do it continuously before entering my classes or I see the things I saw in that subject to have a better memory (DL_5).

Therefore, this information suggests that autonomy outside the classroom allows the participants to perform the language effectively. Their self-schedule allows them to take advantage and benefit from their formal learning at the Language Department. Also, the responses demonstrated they spent several hours on their learning. The information also suggests that the participants pay special attention to learning English on their own.

Overall, these results indicate that the participants in this study shared a similar experience learning English in the language department. They showed positive and common attitudes towards the reasons why they learn English. Also, they stated beneficial strategies to learn the language outside the classroom and to keep motivated to learn it. Finally, the participants expressed the negative feelings in the learning time-lapse.

5. Conclusions

The present study was conducted to identify the students' attitudes towards English language learning in the language department of the University of Guanajuato. One of the most significant findings is the relation between the positive attitudes the participants have developed toward the learning process and the positive performance in their learning. The study explored

the different dimensions that belong to learning attitudes: cognitive, emotional, and behavioral attitudes. The relevance of cognitive attitudes was attributed to the reasons of participants to study English. All the participants showed an interest in the language and a tool to graduate from their BA programs. Most of the participants perceived English as a valuable tool for their future professional fields. Emotional attitudes revealed that all the participants experienced a negative feeling when the language class advanced. Most of the participants had difficulty remembering all the knowledge when the English level was moving forward. The importance of behavioral attitudes is attributed to the autonomous strategies the participants implement to learn the language by themselves. All the students employed music, podcasts, movies, series, and other sources of input to improve their English language. Overall, the similar views, experiences and strategies the participants faced in their learning process are assigned to positive and some negative attitudes.

An implication of the study is the possibility that the participants at the University of Guanajuato perceive the language as valuable for their future professional fields. This research offers a framework for the exploration of how the different contexts of English learners influence their attitudes and perceptions of the language and the process of learning it. The pedagogical application suggests strategies to foster positive attitudes toward English learning. The application is a possible continuation of the study or future research.

Finally, two important limitations need to be considered. First, the sample size is limited to only six participants out of hundreds at the University of Guanajuato. Also, the data collection was done with only one instrument, and vital information cannot be collected using one. Further research is required to explore the same topic but with a high sample size of English learners and using more instruments to collect data.

In conclusion, the study contributed to the field of English teaching and learning practices. It is suggested that English teachers should be aware of how the different learning attitude dimensions impact the students' language performance. Knowing why the learners are studying the language and how it makes them feel can be effective in employing strategies and achieving a plainer learning process.

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A Comparative Study of Discussions, Debates, and Oral Presentations in Enhancing EFL Learners' Oral Proficiency

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Abstract

This case study investigated the effects of different speaking activities (oral presentations, discussions, debates) on the speaking performance of 11 young adult EFL learners at a university in central Mexico. Data was collected through semi-structured interviews and an online survey and analyzed using thematic analysis. The findings revealed that combining socialization with varied speaking activities and incorporating popular culture topics relevant to students increased motivation, reduced the affective filter, boosted confidence, and improved fluency and accuracy. The integration of student interests and fostering of personal relationships promoted a holistic understanding of cognitive and metacognitive strategies, enhancing overall speaking skills. However, limitations include a small sample size from the same sociocultural context. Further research with a larger, more diverse sample is recommended for unbiased results. The study highlights the benefits of tailoring speaking activities to students' interests and encourages developing interpersonal relationships to facilitate language learning.

Keywords: EFL, speaking activities, speaking skills, affective filter, socialization, student's interests.

1. Introduction

In the field of English as a Foreign Language (EFL) teaching there are several effective pedagogical approaches to foster communicative competencies among language learners. Communicative Language Teaching (CLT) emphasizes spontaneous and contextualized interaction with the target language, going beyond the learning of fixed linguistic structures (Cook, 1991; Richards, 2006). The main objective of CLT is the development of learners' grammatical, sociolinguistic, and discourse competencies through authentic language use (Savignon, 2002). However, several factors can influence the language acquisition process for young adult EFL learners, including affective variables like motivation, self-confidence, and anxiety (Krashen, 1982; Lemana et al., 2023), as well as metacognitive strategies (Zhang & Zhang, 2018) and sociocultural contexts (Byram & Grundy, 2003). Recent years have also witnessed an increasing integration of popular culture elements into EFL classrooms, aiming to enhance learner engagement, motivation, and intercultural competence (Rabbani, 2015; Nodira & Tohira, 2023). Within this communicative setting, the present study investigates the effects of three different speaking activities – oral presentations, debates, and discussions – on the oral performance of young adult EFL learners. Specifically, it aims to determine whether these activities, which align

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with Brown and Yule's (1983) functions of speaking (performance, transaction, and interaction), impact learners' vocabulary acquisition, fluency, motivation, and confidence in producing English. By exploring the potential benefits and challenges associated with these interactive tasks, this case study seeks to fill the gap in understanding the effectiveness of different speaking activities in developing aspects of oral proficiency through empirical research. The study aims to inform pedagogical practices that can effectively support the development of learners' communicative competence. The general research motivation is to gain valuable insights that will help in the development of a successful integrative process for enhanced EFL learning. Speaking skills are arguably one of the most challenging of the English language process (Leong, 2017) due to factors that are related to the students and their context. The specific objective of this study is to design strategies to elicit meaningful and coherent speaking production in young adult learners. This comparative study aims to identify the impact of different speaking activities – debates, presentations, and oral presentations – on the enhancement of oral performance among 11 EFL young adult learners in a university in Guanajuato, México. Grounded in sociocultural learning theory and the affective filter hypothesis, a qualitative approach collects interview and survey data for thematic analysis. The research question asks which speaking tasks most effectively facilitate participation, engagement, motivation, and speaking competence gains. Findings aim to inform pedagogical choices regarding the optimal use of speaking tasks to develop oral fluency in EFL learning.

2. Literature review

2.1 *Communicative Language Teaching (CLT)*

During the decade of 1970, Communicative Language Teaching (CLT) emerged as an alternative approach to the traditional method of Grammar translation in English as a Foreign Language classroom (Cook, 1991). Unlike learning fixed linguistic structures, CLT emphasizes spontaneous and real interaction with the target language (Richards, 2006). Savignon (1983) discusses CLT as the development of grammatical, sociolinguistic, and discourse competence based on the model of communicative competence first applied by Canale and Swain (1980). These competencies are developed through knowledge of the language, the ability to converse coherently and cohesively following societal norms, and the ability to effectively communicate, accordingly. The communicative approach in the English as a Foreign Language classroom allows the learners to produce language according to the context in which they are. The instruction of English with a communicative approach establishes a collaborative environment where learners interact confidently with their peers. Similarly, the collaborative nature of CLT relates to the Sociocultural learning theory proposed by Vygotsky (1985), which places socialization as the means for learning effectively to communicate (Pathan et al., 2018). The role of the learner in the CLT classroom is of a communicator; students in a classroom with communicative goals must share ideas, and convey and negotiate meaning (Lightbown & Spada, 2013). Language learners become a community and develop a sense of belonging in the classroom. Through interaction, the learners acquire new interpretations and forms of the language. Speaking activities like debates, presentations, and discussions support the communicative principle of CLT, with authentic opportunities for language production.

2.2 *Factors influencing young adults' EFL learning process*

Several factors influence general language acquisition and proficiency in English learners, considering the dynamic interaction of their affective filter, cognitive abilities, metacognitive awareness, and context-specific factors (Dörnyei, 2005). One significant factor is the affective filter, a key component of a hypothesis first proposed by Krashen (1982) regarding

language acquisition. The affective filter highlights internal factors affecting students' language learning and performance, encompassing elements of motivation, self-confidence, and anxiety. A higher affective filter correlates with high anxiety levels, diminished confidence, and low motivation in language learning. Students who present a higher affective filter are more likely to be reluctant to participate in speaking activities (Lemana et al., 2023). Examining the affective filter factors concerning speaking activities allows for the discussion and identification of patterns among learners, fostering a positive environment in which they produce the language.

In addition to the affective filter, another factor influencing EFL learners' linguistic development is their access to metacognitive strategies. Such strategies enable students to self-regulate, self-monitor, and self-evaluate their learning process. Students who foster these strategies demonstrate more efficiency in conveying meaning and problem-solving (Zhang & Zhang, 2018). Furthermore, exploring how students approach their learning process in speaking activities could aid them in developing awareness and new metacognitive strategies.

Moreover, the integration of popular culture elements has become increasingly significant in English Language Teaching in recent years. This involves implementing contemporary events, current music, movies, and digital media within the classroom for linguistic purposes (Rabbani, 2015). Incorporating popular culture in the EFL classroom enhances various language skills among students, both linguistically and psychologically. This integration can increase motivation and confidence regarding language learning, as students engage with material of their interest, thus contributing to a more meaningful and successful learning experience (Nodira & Tohira, 2023). Additionally, integrating culturally relevant material can contribute to developing intercultural competence and awareness among young adult English learners (Troncoso, 2010). By understanding these factors-affective filter, metacognitive strategies, and the integration of popular culture – educators can better support EFL learners in their linguistic development and create a more engaging and effective learning environment.

2.3 *Speaking activities and functions*

Speaking abilities can be the outcomes, as discussed by Brown and Yule (1983), of talking with a purpose: talking as an interaction, talking as a transaction, or talking as a performance.

Speaking activities allow learners to develop in-context language through communicative-aimed instruction. Oral presentations directly relate to speaking as a performance, where students present a prepared speech, focusing on delivering a specific message and paying attention to the accuracy of the language used. Debating has the function of speaking as a transaction, where the learners exchange and negotiate information to persuade the audience and win the debate. The discussions in the classroom relate to speaking as an interaction, where the students are involved in active listening, turn-taking, and conveying of meaning (Richards, 2008; Celce-Murcia, 2014). This integration of language within specific and meaningful contexts, the use of appealing material, and scaffolded interaction between peers gives learners a comprehensive approach to the development of their speaking competencies.

3. Methodology of the study

The research question in this study aims to answer is "How do the different speaking activities – debates, discussions, and oral presentations – affect the oral performance of young adult EFL learners?" This research adopts a qualitative paradigm, as defined by Denzin and Lincoln (2011), which emphasizes understanding phenomena through personal perceptions and experiences, delving into context-specific details. The method of this paper is a case study. Case

studies allow the interpretation of phenomena according to contextual influences. This case study encompasses a comparative analysis that involves three different speaking activities. A comparative analysis allows this case study to examine applications to determine which speaking activities are the most successful. To make sense of insights through the qualitative paradigm, it is necessary to employ instruments that gather qualitative data from the case study participants, such as semi-structured interviews and an online survey,

3.1 *Context and participants*

The context of the case study is an English class from the University of Guanajuato, in the Language Department in the city of Guanajuato. This class is the second hour of a three-hour-long session. These sessions are once a week, and the first and third hours are taught by the head teacher. The hours taught by the head teacher are focused on linguistic accuracy development with the support of textbooks. It is a 700-level class. There are 11 students between the ages of 18 and 28. The participants show a shared interest in relevant topics and contemporary media. All the participants of this study agreed to share the information collected for research purposes. The time frame considered for this case study is one semester. During this semester, once a week the researcher applied different speaking activities to register which received more response and engagement from the student participants.

3.2 *Instruments*

Semi-structured interviews allow the researcher to have general key points to ask the participant, with the variability of delving into emerging related themes. This type of interview acknowledges students' perspectives while keeping the focus centered on the main topic (Cohen et al., 2018). In that sense, the survey gathers self-reported data that provide a deeper understanding of the phenomena (Dörnyei & Taguchi, 2009). This has been proven effective for the compilation of data that allows the study of EFL strategies and students' outcomes (Mackey & Gass, 2016). To complement the insights obtained from interviews and surveys regarding the perceived efficacy of the activities, participants provided numerical ratings on 5-point Likert scales (Turner, 1993), self-evaluating their preferences and engagement with debates, discussions, and individual presentations. The platform used for the survey was Google Forms, while the semi-structured interviews were conducted face-to-face.

3.3 *Data analysis*

In a thematic analysis of data, the researcher can identify patterns across the participants' responses (Braun & Clarke, 2012). Interview and survey responses were reviewed through coding to identify common themes related to student perceptions of how the different speaking activities impact their speaking abilities and performance. Organizing thematic data enables a macro-view of processing from raw qualitative data analysis, preserving clear connections across the coding stages. Using micro-level charts promoted systematic data to highlight answers to the research question regarding the different speaking activity impacts on skill development, motivation, and oral fluency gains. The analysis of data allowed patterns to emerge, facilitating the identification of shared elements that influence communication in learners.

4. Findings and discussion

Challenges in speaking

During the interviews, the students pointed out the most challenging aspects of communicating ideas in their L2.

In the following extract, Participant S1 identifies the challenges they face regarding speaking: "not enough vocabulary or know that I'm using the correct phrases." Appropriate vocabulary usage stands out as the most challenging element of English for successful communication, with nine participants highlighting vocabulary limitations as their primary difficulty. Having a lack of vocabulary interferes with the conveying of messages and the structure of ideas in oral expression. Consequently, limited appropriate vocabulary lowers confidence in students and hinders their oral performance directly correlating to the affective filter hypothesis.

Another challenge in speaking is fluency. In Participant S2's response: "it's complicated the fluency," they expressed difficulty with this aspect of speaking. Similarly, all the participants expressed fluency as a barrier to communicating efficiently. Fluency development includes clear integration of ideas between expressions, logic, and a steady flow of speech. Additionally, the pressure to speak fluently in real-time conversations can elevate anxiety and self-awareness, contributing to the affective filter. These challenges can lower confidence in students, affecting their general speaking abilities.

Interaction for acquisition

A pattern identified during the data collection from students' responses suggests that interaction with classmates plays a beneficial role in the acquisition of vocabulary.

In one example of this, Participant S3 stated that interacting with peers is beneficial for their vocabulary construction: "When we are talking to each other … It helps me to learn new words." Participant S4 expressed that they learned from their more proficient peers: "My classmates have advanced English and I learn from them." That view was shared by the 11 participants.

The students expressed they found benefits in collaborative tasks for their speaking skills' development, reflecting the sociocultural theory's emphasis on peer interaction for language acquisition. Developing activities where students engage in interaction and socializing promotes new context-specific vocabulary acquisition.

The data collected from the students' responses highlighted the beneficial role that plays interaction in the improvement of linguistic acquisition. Contextualized learning material facilitates the understanding and retention of vocabulary, idiomatic expressions, and linguistic structures. In the different activities, the students communicated and expressed their ideas by working cooperatively and individually; as well, the students were assessed by the teacher to correct linguistic inaccuracies. These activities helped develop verbal skills through the sharing of ideas through authentic language. The development of engaging activities, encourages the learners to interact and socialize with peers, promoting the understanding of new meanings, ideas, and vocabulary items. In addition to building vocabulary, peer interaction helps learners in acquiring new speech patterns, meaningful communication, and confidence. As students direct their learning process with communicative goals, the language implemented becomes meaningful and useful for further interactions.

Moreover, Participant S5 suggests: "Having conversations with my classmates is something challenging, but I feel it helps me learn new skills." Interaction among peers promotes cognitive engagement, as the learners involve several skills in their language production, such as critical thinking, problem-solving, and other metacognitive processes.

The discussion of these extracts highlights the importance of interaction among peers, to contribute to a positive learning atmosphere. It can be inferred that the personal bonds between the learners allowed them to develop scaffolding strategies. As well, authentic and meaningful communication among learners is encouraged to acquire an increased domain of speaking abilities.

Improved confidence on speaking skills.

The students reported increased confidence towards the end of the case study after performing several types of speaking activities with peers.

For instance, two students, Participants S6 and S7, expressed in their survey answers: "You can feel confidence, and you can help each other," "My classmates have advanced English and I learn from them." In an extract from Participant's S8 interview response, they identify the following benefit from collaborative practices: "At first, I felt very shy and nervous to speak, but having speaking activities all the time helped me lose the nervousness."

Continuous practice with peers helps students feel more confident in their speaking abilities. These abilities can be developed through scaffolding strategies that students develop while interacting with peers of different proficiency levels. Moreover, during the interviews, the students conveyed that because of continuous practice, they felt less anxious than in the first few practices of speaking activities in the case study. Through collaborative speaking tasks, the students created a learning environment where they provided meaningful feedback. The students can learn from peers who have more proficiency in the language, having linguistic gains such as new idiomatic expressions, grammatical structure, and metacognitive skills. In the interactions with classmates, the learners also created personal connections with the sharing of interests, boosting motivation and a positive learning context.

Increased motivation in learners.

Throughout the interviews and surveys, it was discovered that implementing topics relevant to the students, there was increased motivation.

For example, one student, Participant S9, expressed: "Talking about what I like helped me feel more motivated because I wanted my classmates to know about me too."

This perspective was shared by all the participants, who stated that sharing their interests pushed them to get involved more with the class. The consensus indicates that when students use material from popular culture topics within their interests, they feel more engaged with the activities, participate more in class, and interact more with their peers. This motivation increase happens to the students when they share concepts that are meaningful for their daily lives and personal interests.

Likewise, Participant S10 expressed motivation for participating in class in their response: "I wanted my classmates to learn about things I like." Implementing popular culture material puts into practice the learners' previous knowledge of the topics. Moreover, the material provides a sense of cultural relevance in the learning process, with the students exercising respectful communication and politeness strategies. These strategies develop cultural awareness and are useful for the holistic development of students' communicative competencies. Integration of social and cultural awareness in the classroom fosters positive self-esteem among students and creates a stimulating atmosphere where students apply scaffolding techniques.

In the following participants' responses, Participants S11 and S12, they identify that: "Because my classmates know a lot, I learn new ways to express myself," "After doing lots of presentations I feel confident, unlike before, when I made a mistake, I froze." Through the collaborative and scaffolded strategies applied among students for their speaking activities, the learners developed empathetic and positive environments where learning mistakes become part

of the process of improving at the language; this environment welcomed constructive feedback, where students corrected each other and created meaningful personal connections.

Prior preparation for speaking tasks.

The students highlighted the importance of preparation for speaking activities, reinforcing the literature review's emphasis on reducing anxiety through adequate preparation. In the interviews, the participants expressed that preparing before each speaking task serves multiple benefits in their speaking skills.

One example of this is the response of Participant S13: "Preparing before the activity helps me in feeling confident and ready to know the vocabulary." In this extract, the participant highlighted the benefits of preparing before producing any speech.

Similarly, Participant S14 explained how researching provides certainty in the use of complex concepts in a more advanced learning environment: "In the 700 level of English classes, we use many concepts that are difficult when you don't know what they mean… When I investigate to prepare for my speaking, I feel confident and sure that I am using them correctly." Asking questions, researching, and brainstorming about the topic of the class, allows the students to prepare beforehand what type of vocabulary they will use. Prior preparations for speaking tasks lowers anxiety and boost confidence in the participants' speaking performance. This reduction of the affective filter removes internal challenges in the students and lets them feel prepared for the task, leading to a more fluent and confident oral production.

The most effective speaking activity.

Each speaking activity serves different purposes according to the abilities and needs of the students. In this case study, the most effective speaking activity for the development of abilities was the debates.

An instance of this finding is the statement of a student, Participant S15, in the interviews: "… all the activities helped me in something, but the best were the debates."

In the case study, the three speaking activities applied were helpful in the development of specific abilities. However, the debates stood out as they presented the most benefits within a single activity for language development. Debates allow students to prepare, research, and reflect upon their expressions. As well, debates present important requirements of both accuracy and fluency, while communicating with peers. The debates involve several skills at different levels of speaking. The stages of debates allow students to prepare a thought coherently and deliver it to persuade. While preparing for a debate, students must explore complex concepts and structure them in an intelligible way. In debates, students manipulate meanings focused on accurate information in real-time, to argue with their counterparts and persuade audiences. Throughout the debate, the participants must reflect and reanalyze their contributions to the argument. This presents a challenge for students to create persuasive and logical ideas, contributing to the meaningful development of communicative strategies.

Another example of this finding is the self-reported data item from Participant S16 in the survey, where they indicate they find "…the debates as the most helpful speaking activity." Students' engagement in debates allowed for meaningful contributions, where students analyzed and prepared facts and arguments, resulting in the improvement of several specific speaking skills.

Conclusion and implications

The main objective of this case study was to determine whether three different speaking activities affected the oral performance of English learners and if so, how. The data from the participants was gathered through semi-structured interviews conducted face-to-face and an online survey. The students' responses were examined with thematic analysis to identify general

topics that were common among the participants and their speaking performance. Throughout the semester of this case study, the student participants were involved in different speaking activities that enabled them to use the target language serving different functions. Among these language functions were the exposition, argumentation, and discussion of several topics that interested the students. The results found during this analysis were discussed to identify the effects of the speaking activities and how they impacted the students. During the discussion, the main findings highlighted that the dynamic of speaking activities benefits and challenges the students in their linguistic fluency. On the one hand, the participants' responses first identify the challenge of limited vocabulary, which hinders clear and fluent communication between the learners. On the other hand, the students expressed several benefits from participating in these activities. These benefits include increased motivation and confidence in oral performance, through the integration of topics relevant to the participants. Additionally, this study highlighted the importance of peer interaction for the development of new linguistic skills, with improvements in vocabulary gains and fluency. Finally, the finding of the debates as the most successful activity indicates that this type of speaking interaction results in students feeling more confident, prepared, and with better reasoning of their cognitive and metacognitive skills.

The implications of the present study provide a new understanding of how different types of speaking activities help learners develop communication skills. Communicative Language Teaching in the target language English and the Sociocultural learning theory strongly relate to the findings of this empirical research, by linking the performance of EFL learners with internal and external factors. Students' motivation, affective filter, and involvement with their peers can either hinder or enhance speaking production. By noticing and implementing personal interests, the CLT classroom can become a positive integrative environment where students thrive and enjoy their learning process.

The limitations of this study include a limited number of participants that belong to the same sociocultural context and the application of the study was of one hour each week during one semester. Further research is recommended with a greater number of participants from different backgrounds with an extended timeframe to assess that the results are unbiased. As well, it is also recommended that further studies are carried out with varied age groups to identify if there are other personally meaningful strategies for eliciting successful communication.

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Appendices

Appendix 1. Interview guide

Question	Code
1. Do you think socializing and working with classmates contributed to your English learning process? How?	IQ-1
2. Recall a classroom activity that helped enhance your English skills. What made it effective? How did it help you?	IQ-2
3. Did discussions, debates, and oral presentations help with learning new vocabulary? How did it help you?	IQ-3
4. In the first presentation, you talked about a work that is meaningful for you. Did this make you more motivated to participate in class? Why or why not?	IQ-4
5. Can you identify any changes in your confidence and ability to express yourself in English after participating in discussions, debates, and presentations in the classroom? If so, please explain.	IQ-5
6. What would you need to enhance your speaking in oral presentations, debates, and discussions?	IQ-6

Appendix 2. Online survey guide

Question	Code
1. On a scale of 1 to 5, how confident do you feel about your English speaking abilities?	GFQ-1
2. What specific aspects of English do you feel you need to improve the most?	GFQ-2
3. How comfortable are you with participating in class discussions and conversations in English?	GFQ-3
4. What types of activities or exercises in the class do you find most helpful for improving your speaking and communication skills?	GFQ-4
5. What topic seen in class is your favorite so far?	GFQ-5
6. What activity done in class is your favorite so far?	GFQ-6
7. Do you have opportunities to practice English outside of the classroom? If yes, please describe.	GFQ-7
8. What challenges do you face when trying to communicate in English?	GFQ-8
9. How would you rate the effectiveness of the communicative approach in helping you develop your English skills?	GFQ-9
10. How often do you use English in your daily life outside of the classroom?	GFQ-10
11. How do you feel about group activities or pair work in class? Are they beneficial for your language development?	GFQ-11
12. Do you have any additional comments or suggestions about the English language learning experience in our class?	GFQ-12

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