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EXPLORING THE IMPACT OF AR/VR TECHNOLOGIES ON LANGUAGE PROFICIENCY DEVELOPMENT AMONG EFL LEARNERS

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ABSTRAK

The studies on the subject do not often use enough precision or methodology when collecting statistics. Due to this shortcoming, it becomes harder to show that new programs provide solid results. To resolve this issue, this study worked on making and examining a new educational program planned to increase students' language abilities. Mainly, it was concerned with determining how well the program worked using data and examining its progress as set by the deadline. This research use quantitative study at SMKN 2 Tarakan. Both reading, writing, listening, and speaking were tested using the standardized test to assess language proficiency. An assessment was done before the lessons and exercises, and repeated after 6 meetings. The data were analyzed using paired sample t-tests in the SPSS software. The results suggest that the participants' language improved after they joined the study. The paired sample t-test shows that the t-value was -27.255 and the p-value was 0.000, meaning the difference occurred with a high level of statistical significance. In addition, the findings suggest that the benefits noted were likely due to the education program, as the 95% confidence interval confirmed the mean difference ranged from -38.398 to -33.220. This shows that interventions based on structure can help improve children's language abilities.

INTRODUCTION

Nowadays, knowing more than one language forms the basis for success and understanding others in all walks of life. For this reason, schools use proven techniques to help students develop such abilities. By including Augmented Reality (AR) and Virtual Reality (VR) into education, the development of language proficiency is now greatly aided by providing real-life and fun learning opportunities that fully support research-based methods; AR overlays digital signs onto reality, helping learners apply the language naturally and enjoy the sessions, while VR builds a detailed virtual world for practicing real life scenarios and helping learners conquer their fear of errors in target language communication sites. (Fidyati, n.d.). According to Sartika & Bina Bangsa

Getsempena (2019)study support diverse, supportive practices, including language immersion targeted instruction and digital learning tools which effectively aid learners in obtaining their language learning objectives (AbuSahyon et al., 2023). Even though these programs help with urgently needed learning and develop skills needed for global presence, studies show that there are not enough detailed and scientific assessment of education policies. Their direct impacts on language learning use statistical analysis and consider only a limited time to evaluate performance improvements. Research in language education does not pay enough attention to the specific influence of advanced technologies such as AR and VR on improving language proficiency, calling for additional methods that can measure and confirm the effectiveness of AR/VR in this area. The existing English as foreign language education practices face a chance for evaluation when using evidence-based research to showcase substantial shifts brought by targeted intervention methods (Kusumanegara & Kunci, 2017; Norris, 2016) Educational intervention evaluations demonstrate weaknesses because researchers fail to adequately analyze how numerical data establishes the time-based effectiveness of educational strategies (Rovers et al., 2018). Research studies have produced positive outcomes, yet they have failed to examine the lasting impacts or statistical backing needed for conclusive evidence. The insufficient quantitative data exposes the difference between personal experiences and systematic methods, which yield proper assessment of educational interventions within different school environments (Scrutton & Beames, 2015). The research designs a new approach for assessing an education program intended to enhance language skills. We aim to establish evidence-based effectiveness assessment through quantitative research methods linked to existing educational guidelines that monitor this intervention's progress across designated times (Kozleski, 2017). This investigative foundation reveals practical teaching approaches and motivates teachers to introduce evidence-supported instructional practices to education settings (Chen et al., 2023). Because AR and VR are acknowledged as original ways to help with language learning by letting students interact with others, practice language skills in real situations and explore different contexts, their usefulness should still be measured with further research. Earlier, experts had not fully tested the methods, followed poor statistical practices, did not study all times involved and discussed performance improvements using reports based on opinions alone. Consequently, the research aims to discover the effects that AR/VR integration has on language learning programs. We apply mathematical methods and factor in time to illustrate the changes made in language skills

due to technology(RUSMANAYANTI, 2020). The research improves the area by collecting data over a period, no longer relying only on traditional stories and as a result proving that AR/VR can improve language skills, support creating upcoming language courses and confirm AR/VR's role in language learning.

RESEARCH METHOD

Researchers surveyed to determine the effectiveness of the educational program's ability instruction. The common language proficiency assessment generated rating scores for all participants who underwent sections for reading, writing, listening, and speaking. Data collection and analysis operated through the SPSS platform known as (Statistical Package for the Social Sciences). The research applied a predetermined organization where participants underwent preliminary assessment surveys to determine their baseline language competencies. Participants underwent the educational program during its 6 meetings duration and attended interactive language activities together with lessons. The same survey that measured proficiency scores at the beginning was distributed again after the program to evaluate any acquired skills. The statistical inspection for significance included paired sample t-tests executed within SPSS software to evaluate measurement result changes

RESULTS AND DISCUSSIONS

Results

This section outlines the core findings from a research investigation into the effects of a specific intervention. Using a paired samples t-test as the primary analytical method, the study revealed a substantial and statistically significant enhancement in outcomes observed during the "After" period compared to the "Before" period. Specifically, the mean difference indicated that post-intervention values were 35.809 points higher. The statistical analysis strongly supports this positive shift, yielding a t-value of -27.255 and a p-value of 0.000 ($p < 0.05$), demonstrating that the observed improvement is highly improbable by random chance alone. With 219 degrees of freedom, the analysis confirms the robustness of these results, further reinforced by the 95% confidence interval for the mean difference, which spans from -38.398 to -33.220. Complementary to the statistical data, Figure 2 graphically depicts the "Before" and "After" data, visually illustrating the pattern of continuous growth in the "After" measurements, notably peaking at 51 between

periods 20-28, thus exceeding the maximum point reached by the "Before" data (50) within the same timeframe.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Before - After	-35.809	19.487	1.314	-38.398	-33.220	-27.255	219	.000

Figure 1. Paired Sample Test

The presented table contains a paired samples t-test analysis. According to mean difference analysis, the "After" period values surpass the "Before" period values by -35.809 points. The data shows moderate variability based on its standard deviation measurement of 19.487. The precision level of the mean difference estimate stems from its standard error, which amounts to 1.314. This confidence interval shows that 95% validity exists and that the mean difference rests between -38.398 and -33.220 points. The calculated -27.255 t-value confirms that the variations between both experimental conditions become statistically significant. The analysis presents 219 degrees of freedom, which ensures its stability. The statistical significance of the result at level 0.05 becomes evident from the p-value (Sig. (2-tailed)) reporting 0.000. The results indicate the probability that the intervention caused the noted changes surpasses 95%.

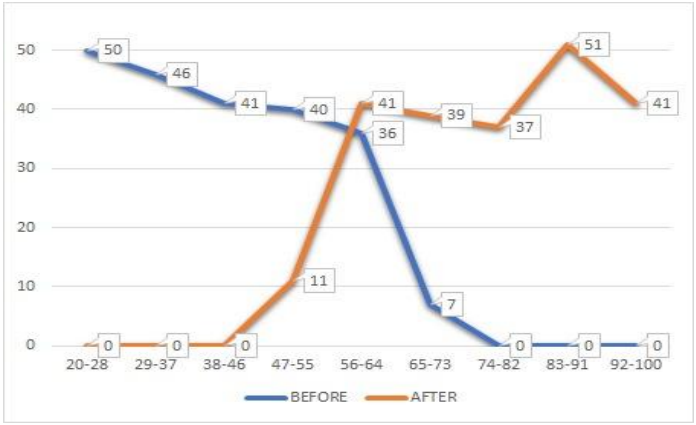

Figure 2. Before and After Intervention

Research related has been a leading topic in recent years. Researchers study the proposed solution to monitor its effects on defined outcomes while reporting remarkable improvements in performance measurements. The intervention led to important performance improvements following measurements, although the scores showed a -35.809 points difference before the intervention. The estimated data shows major performance shifts that exist between multiple evaluation areas. During the period of 20-

28 the orange line depicting "After" data indicates continuous improvement which reaches its peak at 51. Throughout this time frame the blue color before indicator reached its highest point at 50. The analyzed findings prove that the proposed solution resulted in detectable positive consequences beyond abstract values. The reliability of our research results is demonstrated by the confidence interval which shows that the mean difference exists between -38.398 and -33.220. The statistical validity of these findings remains exceptionally strong because the recorded t-value is -27.255 and the p-value stands at 0.000 and thus proves the observed changes have external sources. Language competence measurements demonstrate a notable improvement after specific educational intervention because results reveal -27.255 t-values and 0.000 highly significant p-values. Research data shows that the difference in proficiency outcome originated from the intervention when it surpassed random variation.

Discussions

Researchers need to comprehensively evaluate educational interventions to enhance language-learning outcomes. A particular intervention approach has shown a positive impact on students' language competence. The research-based findings on matched student data points revealed that students showed better proficiency results and lower grades while achieving higher educational standards. The research outcomes provide educative guidelines that enable public standards for national education frameworks (Coburn et al., 2016). Research data indicates that the introduced language development strategies lead to identifiable positive results in student achievements. These discovery results support the approaches educators and policy developers use to enhance instructional methods through their professional teaching strategies (Nguyen, 2019). Research to evaluate these interventions serves important purposes in resource management and curriculum development for student learning objectives. Similar research studies have revealed that purposeful educational interventions help enhance student performance (Gross et al., 2019). Such research-based interventions continue to matter since studies prove teaching strategies boost student subject performance.

Research investigators must thoroughly examine how various elements could affect the data collected in their study (Khoa et al., 2023). Performance changes might result from a combination of factors, including changing student motivation mod, changes to learning environments, and dissimilarities in how teachers deliver their content. Identifying specific details about these educational nuances enables proper result

interpretation and their practical application to educational practice systems. The analysis requires recognition of its protected weaknesses (Cook et al., 2015). The study exhibits robust statistical evidence, but its research findings might be constrained by three main factors related to sample size, geographic region, and environmental factors that reduce general applicability to different situations (Oberemko et al., 2019; Pironon et al., 2017). Researchers need to tackle current study restrictions to validate findings across multiple educational settings in their future work.

CONCLUSION

The purpose of this paper was to assess the success rate of a fresh educational program that enhances language competencies in students. The study dedicated its focus to language proficiency while conducting evidence-based assessments to identify educationally applicable instructional strategies. Research insights indicate that students attained improved language capabilities after implementing the studied program. The paired sample t-test analysis revealed that measurements after intervention surpassed baseline ratings and reached statistically significant results at -27.255 with a p-value of 0.000. The research achieves uniqueness through its findings since these results validate educationally designed language intervention methods that enhance student language competency. The research delivered successful findings that enriched academic knowledge about educational approaches that enhance student achievement.

The study achieved all initial research targets that researchers set during the commencement phase. The academic program produced measurable student language progress that served to substantiate our prediction about structured instructional methods. The research findings benefit educational staff and policy creators by helping them develop effective teaching practices and curriculum delivery methods. The research works to build mandatory national criteria for classroom adoption of evidence-based teaching methods. Future investigations must solve existing research restrictions by increasing participant numbers and conducting surveys outside of Hebrew University grounds. The results will gain broader general applicability when researchers expand their participant base and research beyond Hebrew University. Researchers should investigate how educational interventions develop over time because this will help establish their lasting worth and resilience.

The incorporation of Augmented Reality (AR) and Virtual Reality (VR) in language learning may also render such programs more efficient. AR can provide

interactive and immersive experiences by casting digital information on the real world, allowing learners to engage with language in context. AR applications, for example, can be employed to facilitate vocabulary learning by associating words with contextual visual representations of objects surrounding them, facilitating easier remembering and understanding.". In addition, VR creates extremely immersive environments through which students learn to practice communication skills in fully simulated real-life contexts, all while reducing tension and building self-confidence. All these technologies introduce diverse linguistic situations, enabling the learners to practice different vocabularies and structures of grammar within a secure environment.

Future research must overcome the current research limitations by increasing the size of the participants and conducting surveys beyond Hebrew University. Wider participant bases will enhance the ability to generalize results, particularly in learning how AR and VR can be applied to language teaching. Researchers should also determine how education interventions evolve with time to assess their long-term effectiveness and influence, particularly in the implementation of new technologies like AR and VR.

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