

UNLEASHING THE POWER OF PERSONALIZED LEARNING: INVESTIGATING HYPERMEDIA-BASED MODULES FOR ENHANCING ESL PROFICIENCY AMONG PAKISTANI STUDENTS

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ABSTRACT

This study investigates the efficacy of hypermedia-based modules in enhancing English as a Second Language (ESL) proficiency among Pakistani students, focusing on personalized learning styles. Additionally, it explores the impact of these modules on ESL proficiency across diverse learning styles and seeks optimization strategies for improved learning outcomes in the Pakistani context. Motivational levels of students utilizing a computer-assisted language learning program are also examined. The research employs a mixed-method approach, incorporating Self-Determination Theory (Ryan & Deci, 2000) as a theoretical framework, and utilizes pretest and posttest surveys, teacher reflective notes, and open-ended questionnaires. The study, encompassing 200 first-year intermediate students from various departments, employs SPSS 23 for quantitative data analysis and thematic/content analysis for qualitative data. Integrating the ASSURE model (Heinich, Molenda & Russell, 1993) for program design, the findings emphasize the effectiveness of hypermedia-based modules in enhancing ESL proficiency and highlight key factors influencing student motivation, recommending tailored module implementation for optimal outcomes and continued exploration of technology-based tools.

Keywords: hypermedia, modules, personalized, learning, motivation.

INTRODUCTION

Recent years have witnessed the evolution of Information Communication Technology (ICT), enabling personalized learning through methods like intelligent learning systems and the analysis of individual learning data (Dawson, Heathcote & Poole, 2010). Personalized learning, as outlined in the United States National Education Technology Plan 2017, tailors the pace and instructional approach to meet each learner's unique needs, involving adaptation of objectives, approaches, content, and sequencing ("U.S. Department of Education," 2017). Chen, Lee, and Chen (2005) proposed adaptable learning paths based on material difficulty and learner abilities, aligning with Klačnja-Milićević, Vesin, and Budimac's (2011) emphasis on aligning

personalized learning with learners' needs, goals, talents, and interests. The integration of technology in language education, including multimedia resources and interactive platforms, presents opportunities and challenges, necessitating ongoing research on the balance between human interaction and technology, the effectiveness of automated instruction, and the limitations of machine-based approaches (Beatty, 2003). The incorporation of technology in language learning, through electronic devices and online tools, accelerates the process, impacting students, teachers, and curriculum designers. This highlights the importance of integrating technology in public schools to meet educational standards and prepare students for future

contexts, where technology integration is obligatory (Chen, Lee & Chen, 2005).

Hypermedia is integral to global knowledge dissemination, particularly in English as a Second Language (ESL) virtual learning systems, transforming electronic learning through hypertext (Dryden, 1994). However, diverse utilization of these resources necessitates understanding individual learning behaviors and assessing the appropriateness of uniform approaches for diverse learners (Brown, 2002). Personalized ESL learning, as articulated by Paramythis and Loidl-Reisinger (2003), involves dynamically supporting learning by tracking user activity, interpreting it through domain-specific models, and addressing user requirements. Brusilovsky and Peylo (2003) advocate adaptive web-based media for specialized learning materials. Despite hypermedia advantages, challenges persist, including a "one-size-fits-all" approach causing confusion and cognitive overload (Jonassen, 2000; Mayer, 2001). High drop-out rates necessitate exploring adaptive hypermedia for enhanced functionality, proposing strategies like adaptive navigation and presentations (Brusilovsky, 2001).

In Pakistan's educational landscape, English language instruction has traditionally prioritized exam-oriented goals over substantive content knowledge (Khan, 2022; Ali, 2018), particularly in ESL settings (Hussain, 2020). Undergraduates in Pakistani universities exhibit distinct backgrounds, either exposed to English through Urdu Medium Instruction (UMI) or educated in English Medium Instruction (EMI) settings, differing in medium, curriculum, and pedagogy (Ahmed, 2017; Malik, 2019). The intermediate-level English curriculum lacks communicative elements, relying on a teacher-centered Grammar Translation Method (GTM) (Khan, 2022). The Single National Curriculum (SNC) aims to transform English language education with a student-centered, interactive approach prioritizing technological integration for holistic development (Ministry of Federal Education and Professional Training, 2020). Despite efforts, Board of Intermediate Gujranwala (BISE, 2017) reports a 30% pass rate in English, the lowest among subjects, contributing to high dropout rates in Bachelor of Arts (B.A) programs. This study addresses these challenges through transformative technological changes, proposing personalized learning with

intelligent tutoring systems and adaptive platforms (Hwang & Wu, 2014; Khan & Niazi, 2020) as a potential solution to enhance English language skills, increase success rates, and improve educational outcomes in Pakistan.

ESL learners in Pakistan grapple with proficiency challenges due to limited exposure, inadequate language teachers, and outdated methods, necessitating innovative solutions. Hypermedia-based modules, offering personalized learning and enhanced motivation, present a promising avenue for ESL enhancement (Smith & Johnson, 2018). Despite their potential, research on their effectiveness in Pakistan, especially concerning personalized learning styles, is limited (Ahmed et al., 2020). This study aims to investigate the impact of personalized learning styles in computer-based ESL education and assess the efficacy of hypermedia-based modules in elevating proficiency among Pakistani students. Its significance lies in providing fresh insights into the utilization of hypermedia modules for enhancing ESL proficiency, offering an innovative approach applicable to optimizing module design and guiding ESL educators and curriculum developers. Additionally, the findings contribute to the existing body of knowledge in computer-assisted language learning, laying the groundwork for future research in this domain.

Research Objectives

The research aims to:

Investigate the impact of personalized learning styles in computer-based learning on English as Second Language (ESL) proficiency among Pakistani students.

evaluate the effectiveness of hypermedia-based language learning modules in enhancing ESL proficiency among Pakistani students and develop optimized modules for student learning.

measure the motivation level of Pakistani students while using computer-assisted language learning program for ESL proficiency.

Research Questions

The study intends to address the following questions:
How do personalized learning styles in computer-based learning impact ESL proficiency among Pakistani students?

How effective are hypermedia-based language learning modules in enhancing ESL proficiency among Pakistani students and how can the modules be optimized for better learning outcomes?

What is the motivation level of Pakistani students while using a computer-assisted language learning program for ESL proficiency?

LITERATURE REVIEW

Personalized Learning and ESL Proficiency

The surge in attention towards personalized learning and hypermedia-based modules within the educational landscape, particularly in augmenting English as a Second Language (ESL) proficiency, underscores the need for comprehensive exploration. Existing studies attest to the efficacy of personalized learning in delivering individualized instruction and fostering learner engagement (Lee et al., 2020). Concurrently, hypermedia-based modules offer interactive and immersive learning experiences, allowing learners autonomy in content exploration aligned with their preferences (Zhang, 2020; Chen, 2021). Despite the widespread acknowledgment of their benefits, a notable research gap exists regarding their impact on Pakistani students facing unique challenges in ESL learning. Tailoring these approaches to cater to the specific needs and characteristics of Pakistani learners, considering linguistic barriers, cultural disparities, and limited exposure to authentic English contexts, becomes imperative (Ahmed, 2019; Khan & Saeed, 2000; Yousafzai & Khan, 2001). The term "hypertext" has evolved into "hypermedia," encompassing multimedia elements in a computer-based application wherein nodes are linked. These nodes, comprising diverse information, are navigated through an interactive browser with an administration panel serving as a central interface for management tasks. Structure editors play a vital role in modifying node content and links, enabling administrators to shape content relevance and interconnectivity. In certain platforms, operators empower users to modify the knowledge base during browsing, fostering user participation in enhancing the content and organization of the hypermedia program (Shneiderman, 1993; Wendy, 2000; Brown, 1995). Visual cues, interface controls, and navigation features within the hypermedia program ensure a

seamless and interactive browsing experience (Shneiderman, 1993; Shipman, 2000).

The Impact of Hypermedia-Based Modules on ESL Proficiency

Several studies consistently demonstrate the positive impact of hypermedia-based modules on ESL proficiency. Chen and Chen (2019) assessed the impact on vocabulary acquisition, revealing significantly higher gains for learners engaging with hypermedia-based modules compared to traditional methods. Similarly, Chen and Lin (2020) found that hypermedia-based modules improved listening comprehension, attributing this to multimedia-rich environments fostering engagement with authentic audio materials. Wu and Huang (2021) investigated writing proficiency, showing enhanced grammar accuracy, vocabulary usage, and overall coherence and cohesion with hypermedia integration. Despite these benefits, Zareva's (2021) systematic review identified challenges, including variable resource quality and the need for user-friendly module design. Lin and Hong (2022) emphasized individual differences influencing hypermedia instruction outcomes, highlighting the importance of accommodating diverse learner profiles. The literature underscores both the positive effects and challenges associated with integrating hypermedia-based modules for ESL proficiency.

The Concept of Self-Determination in ESL Education

In ESL education, self-determination denotes learners' capacity to assume control over their learning, make autonomous decisions, and foster motivation and engagement in language acquisition. Rooted in the psychological framework of self-determination theory, this concept underscores three fundamental psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2002). When applied to ESL learners, self-determination theory empowers them through autonomy, allowing choices and decisions in setting learning goals and strategies. It further cultivates competence by affording opportunities for skill development, fostering mastery and confidence (Zhang, 2018). The theory also acknowledges the importance of relatedness, emphasizing supportive relationships with teachers and peers to establish a positive

learning environment (Reeve, 2009). Integrating self-determination theory principles in ESL education enhances learners' motivation, engagement, and agency in their language acquisition journey (Wang, 2013).

Exploring Motivation in Computer-Assisted Language Learning Programs for ESL Students

Traditional ESL teaching methods proved ineffective, as students often felt neglected or intimidated, leading to subdued participation and reluctance to speak due to discomfort with the English language and learning environment. Charp (1997) proposed that implementing technology could alleviate anxiety, providing ESL learners with a safe space for expression. Technology served as a medium for connecting students with diverse language backgrounds, encouraging their engagement. Motivation emerged as a crucial factor in ESL class participation, with students facing various challenges and some opting to quit. ESL teachers, striving to attract and retain students, found that technology bridged the gap of insecurity, making English learning creative, meaningful, and inspiring. Clovis (1997) highlighted the motivational power of electronic media in ESL instruction, reducing anxiety associated with language learning. Computer technology facilitated interaction among students in ESL classrooms, fostering improved learning outcomes. The twenty-first century witnessed a new wave of enthusiastic ESL learners, a credit to the effective integration of technology in ESL education.

The ASSURE Model for Designing and Implementing Computer-Assisted Language Learning (CALL) Programs

The ASSURE model, formulated by Heinich, Molenda, Russell, and Smaldino (2002), serves as a systematic framework delineating the design and implementation of computer-assisted language learning (CALL) programs. Comprising six sequential steps—analyze learners, state objectives, select strategies, utilize technology and media, require learner participation, and evaluate and revise—the ASSURE model has garnered empirical support for its efficacy in CALL program development. In the realm of ESL education, scholars underscore the advantageous application of the ASSURE model to augment language learning

outcomes. Lee and Lee (2019), for instance, applied the ASSURE model to devise a CALL program targeting vocabulary acquisition among Korean ESL learners, yielding enhanced vocabulary proficiency and heightened learner engagement. Correspondingly, Chen (2017) employed the ASSURE model in crafting a CALL program for English writing instruction within a Taiwanese ESL context, unveiling positive impacts on writing skills and student motivation. The ASSURE model furnishes educators with a methodical process for the seamless integration of technology and media into language learning environments. Adherence to this model empowers educators to proficiently formulate and implement CALL programs fostering learner engagement, autonomy, and linguistic proficiency.

RESEARCH METHODOLOGY

Research Approach and Design

This study employed a mixed-methods approach to investigate hypermedia language learning, combining qualitative and quantitative methods for a comprehensive understanding. The cross-sectional, experimental design facilitated efficient data collection, and the research design included specific instruments for pretests and posttests, covering listening, reading, writing, and speaking skills. Strategic timing, rigorous statistical analysis, and qualitative indicators ensured a thorough evaluation of the language learning approach's effectiveness.

Population

The research included 200 first-year students from various academic departments at a Sialkot-based private college, utilizing random sampling for gender inclusivity. The teacher, serving in a dual role, maintained academic integrity and cultivated a conducive learning environment. Research objectives focused on personalized learning, hypermedia-based modules, and motivation, offering insights into effective language learning methodologies for Pakistani students.

Sampling

The study sampled a private college in Sialkot, Pakistan, employing simple random selection from different departments for data collection. This method ensured representation, rational numerical

inferences, and ease of explanation. The study spanned two months in a 90-minute class setting.

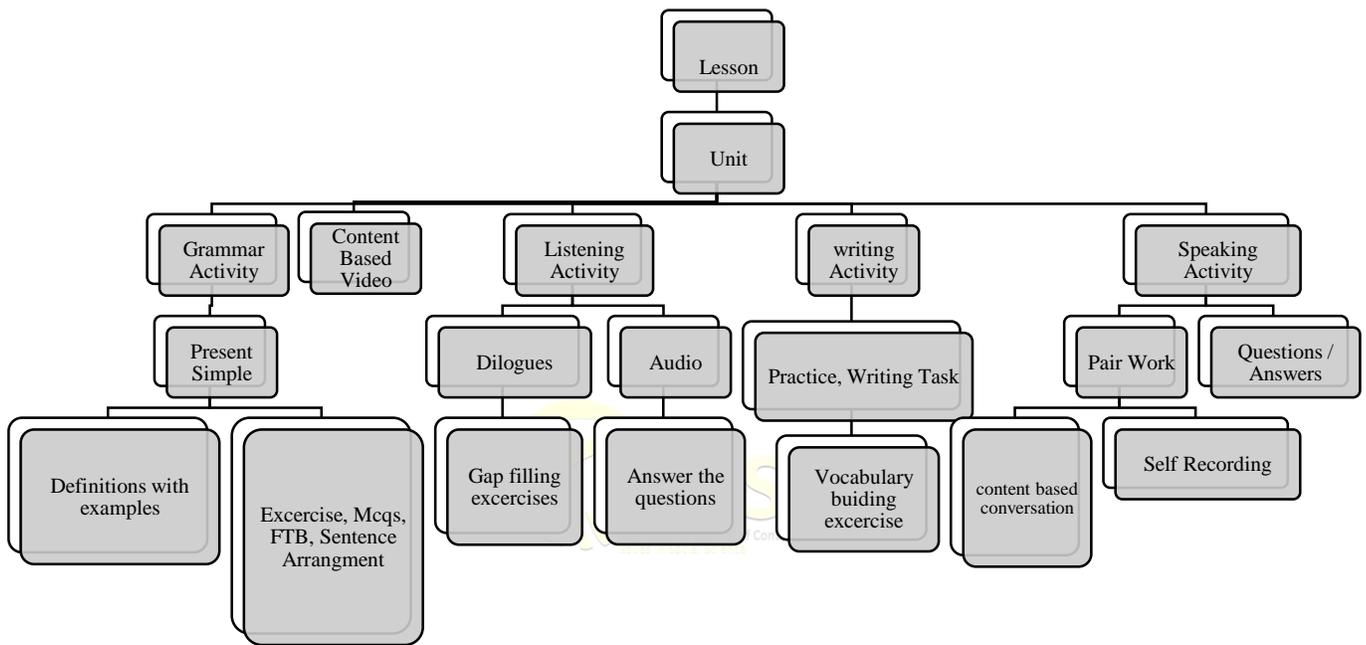
Research Tools

Data collection employed diverse tools: pre and posttests for language proficiency, surveys for student perceptions, teachers' self-reflection notes for qualitative insights, and open-ended questionnaires for detailed student feedback. Statistical analysis

assessed test results, qualitative analysis delved into teachers' notes, and thematic analysis, guided by Self-Determination Theory and the ASSURE model, scrutinized open-ended questionnaire responses.

Lesson Design

Figure 1
Integrated Skills Learning Activities



ASSURE Model

Figure 2
The ASSURE Model Design

A	Analyse Learners
S	State Objective
S	Select Media and Material
U	Utilise Media and Material
R	Require Learner Participation
E	Evaluate and Revise

Note: The study began with a trial unit, developed using the ASSURE model, assessing the need and effectiveness of integrated modules. Learner analysis covered proficiency, language knowledge, interests, and needs. Clear objectives were set. The chosen hypermedia content management system facilitated the use of diverse materials. Utilization involved

systematic uploading and online tests. Learner participation was encouraged through interactive exploration. Evaluation utilized feedback forms, assessing teaching material usefulness and students' confidence in objectives. This ensured effective development, implementation, and evaluation of hypermedia-based language learning modules.

ANALYSIS AND DISCUSSION

This chapter provides a comprehensive exploration of data collection and analysis methods, spanning research collection techniques, data analysis tools, paired sample statistics, and correlations. The study investigates the potential of hypermedia-based modules to enhance ESL proficiency among Pakistani students, focusing on personalized learning. The research adopts a mixed-methods design, utilizing pre and post-tests and teacher's

reflective notes to assess the impact of personalized learning styles on ESL proficiency. Paired-samples t-tests are employed to compare pretest and posttest scores for various language skills. The study aims to contribute valuable insights to ESL education, offering evidence-based recommendations for enhancing language learning outcomes among Pakistani students through the effective utilization of hypermedia-based modules.

Paired-Samples Statistics Results

Table 2

Paired Samples Statistics

			Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest Score	Listening	5.03	200	1.732	.122
	Posttest Score	Listening	6.43	200	1.373	.097
Pair 2	Pretest Score	Reading	4.85	200	1.470	.104
	Posttest Score	Reading	7.50	200	1.456	.103
Pair 3	Pretest Score	Writing	5.23	200	1.766	.125
	Posttest Score	Writing	7.30	200	1.534	.108
Pair 4	Pretest Score	Speaking	4.54	200	1.716	.121
	Posttest Score	Speaking	6.66	200	1.568	.111
Pair 5	Pretest Score	Grammar	5.27	200	1.850	.131
	Posttest Score	Grammar	7.29	200	1.464	.104
Pair 6	Pretest Score	Obtain	24.90	200	5.551	.393
	Posttest Score	Obtain	7.66	200	3.262	.231

Note: In Table 2, The Letter 'N' Represents The Number of Participants Included in the Research.

Pair 1: Pretest Listening Score vs. Posttest Listening Score

The paired-samples t-test revealed a significant disparity between Pretest and Posttest Listening Scores ($t(199) = -10.113, p < 0.001$). Posttest Listening Marks (Mean = 6.43) substantially increased from Pretest (Mean = 5.03), highlighting the positive impact of personalized computer-based learning on language acquisition.

Pair 2: Pretest Reading Score vs. Posttest Reading Score

Significant improvement was observed in reading skills ($t(199) = -20.568, p < 0.001$). Participants exhibited marked progress, emphasizing the effectiveness of tailored learning in enhancing ESL students' reading abilities.

Pair 3: Pretest Writing Score vs. Posttest Writing Score

A noteworthy difference was found in writing skills ($t(199) = -14.655, p < 0.001$), affirming substantial progress and the efficacy of personalized learning in enhancing ESL students' writing abilities.

Pair 4: Pretest Speaking Score vs. Posttest Speaking Score

Posttest Speaking Marks (Mean = 6.66) significantly increased from Pretest (Mean = 4.54) ($t(199) = -16.182, p < 0.001$), underscoring the value of personalized computer-based learning in fostering confident and proficient oral communication.

Pair 5: Pretest Grammar Score vs. Posttest Grammar Score

Participants demonstrated enhanced grammar proficiency ($t(199) = -13.203, p < 0.001$). Posttest Grammar Marks (Mean = 7.29) significantly improved from Pretest (Mean = 5.27), emphasizing the effectiveness of personalized learning in advancing grammar knowledge.

Pair 6: Pretest Obtain Marks vs. Posttest Obtain Marks

A highly significant improvement in academic outcomes was observed ($t(199) = 39.271, p < 0.001$). Posttest Obtain Marks (Mean = 7.66) markedly enhanced from Pretest (Mean = 24.90), highlighting the effectiveness of personalized computer-based learning in elevating students' academic achievements.

The paired samples correlations between different test pairs:

This study employs paired samples correlations to explore the interconnectedness of language skills in ESL proficiency. Analyzing pretest and posttest scores reveals patterns, offering insights into the

effectiveness of personalized computer-based learning for enhancing language skills.

Table 3
Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest Listening Score & Posttest Listening Marks	200	.215	.002
Pair 2	Pretest Reading Score & Posttest Reading marks	200	.222	.002
Pair 3	Pretest Writing Score & Posttest Writing marks	200	.270	.000
Pair 4	Pretest Speaking Score & Posttest Speaking Marks	200	.366	.000
Pair 5	Pretest Grammar Score & Posttest Grammar Marks	200	.168	.017
Pair 6	Pretest obtain marks & Posttest obtain Marks	200	.080	.259

Note: In Table 3, The Letter 'N' Represents The Number of Participants Included in the Research. The correlation analysis showed weak to moderate positive correlations between pretest and posttest scores, with significant associations in listening, reading, writing, and speaking skills (Pairs 1-4). Notably, Pair 3 demonstrated a strong and highly significant correlation ($r = 0.270$, $p < 0.001$) for

writing proficiency. Pair 5 indicated a significant positive correlation for grammar ($r = 0.168$, $p = 0.017$), while Pair 6 showed a weak and non-significant correlation for academic achievement ($r = 0.080$, $p = 0.259$). These results highlight the impact of personalized computer-based learning on ESL proficiency, emphasizing the effectiveness of tailored approaches in enhancing language skills.

Paired-Samples T-Tests Results

Table 3 presents paired samples test results comparing pretest and posttest scores across diverse language skills in the participant cohort. Each test pair corresponds to specific proficiencies: listening, reading, writing, speaking, grammar, and academic achievement. Mean and standard deviation of paired differences, along with standard error of the mean, are provided. The 95% confidence interval offers insights into the likely range of the authentic population difference.

Table 4
Paired Samples Test

		Paired Differences				95% Confidence Interval of the Difference		t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean		Lower	Upper			
Pair 1	Pretest Listening Score - Posttest Listening Score	-1.405	1.965	.139		-1.679	-1.131	-10.113	199	.000
Pair 2	Pretest Reading Score - Posttest Reading Score	-2.655	1.826	.129		-2.910	-2.400	-20.568	199	.000
Pair 3	Pretest Writing Score - Posttest Writing Score	-2.075	2.002	.142		-2.354	-1.796	-14.655	199	.000
Pair 4	Pretest Speaking Score - Posttest Speaking Score	-2.120	1.853	.131		-2.378	-1.862	-16.182	199	.000
Pair 5	Pretest Grammar Score - Posttest Grammar Score	-2.015	2.158	.153		-2.316	-1.714	-13.203	199	.000
Pair 6	Pretest obtain Score - Posttest obtain Score	-17.240	6.208	.439		16.374	18.106	39.271	199	.000

Note: The "t" value serves as the computed t-statistic, quantifying the extent of disparity between pretest and posttest scores in relation to the variability within the sample. The "df" value signifies the degrees of freedom, a metric employed to ascertain the critical value for the t-distribution. The "Sig. (2-tailed)" value denotes the p-value, signifying the likelihood of randomly achieving the observed differences between pretest and posttest scores.

All reported p-values in the test pairs are ".000," indicating highly significant differences in pretest and posttest scores, emphasizing the substantial impact of personalized computer-based learning on enhancing language skills. Negative mean paired differences across all test pairs reflect an overall improvement in language proficiency post-intervention. Small standard errors of the mean in each pair enhance result reliability, suggesting alignment with true population means. These

findings underscore the effectiveness of personalized computer-based learning in augmenting ESL proficiency, advocating for tailored methodologies in language education with significant implications for educators and policymakers.

Teachers' Reflective Notes: An Insightful Perspective on Personalized Computer-Based Language Learning in ESL Instruction

Embarking on a 60-day empirical exploration, this study delves into the intricate landscape of personalized instructional approaches in computer-mediated English as a Second Language (ESL) education, specifically within the context of Pakistani learners. The investigation aims to reveal the far-reaching implications and potential benefits of these customized pedagogical methods. As the study unfolds, scholarly anticipation surrounds the endeavor, fueled by the prospect of unearthing valuable insights into how tailored instructional methodologies can shape and enhance ESL learning experiences for Pakistani students. A subsequent reflective note illuminates the evolving trajectory of students' motivation levels.

With eager anticipation, I introduced a computer-based language learning curriculum aligned with my research interests. Throughout the week, observable cues such as active engagement, substantive inquiries, nuanced non-verbal cues, and modulations in oral articulations reflected students' keen interest and enthusiasm. These compelling observations heightened my motivation, affirming the efficacy of the personalized approach and its potential to foster enriched learning experiences.

The students exhibit notable curiosity, actively engaging in subjects relevant to the computer-based instructional program. Their enthusiastic inquiries, visible through non-verbal cues and lively participation, underscore their eagerness to explore tailored interactive modules. The dynamic interplay and heightened involvement showcase the effectiveness of this instructional approach in fostering enthusiastic and interactive learning participation. Additionally, their active collaboration and constructive engagement in exercises within the computer-based learning program affirm the positive impact of personalized pedagogy, contributing to a motivated learning environment.

Over weeks, I observed students' remarkable improvement in language proficiency and heightened motivation in the computer-based modules. Their enthusiasm, collaboration, and active participation reflected a genuine interest and eagerness to apply acquired knowledge. Their growing confidence and independence were evident in adept module navigation and a positive mindset towards challenges, showcasing a commitment to their ESL learning journey.

In the investigation of personalized learning styles in computer-based ESL learning, diverse strategies were employed to evaluate advancements in students' writing proficiency. Initial measures included administering structured writing exercises targeting various facets of written expression, encompassing paragraph development, coherence, and vocabulary utilization. Tasks involved composing descriptive essays, opinion pieces, and creative narratives, affording students opportunities to refine their ability to articulate ideas systematically. The ensuing reflective note offers insights into students' proficiency levels in writing, listening, speaking, and critical thinking.

The evaluation of students' writing focusing on aspects like varied sentence structure and grammatical proficiency. Feedback on assignments addressed specific areas for improvement. Language skill assessment included interactive listening exercises and virtual conversations for listening and speaking proficiency, respectively. Critical thinking improvements were observed through tasks requiring analysis, interpretation, and problem-solving, showcasing enhanced cognitive abilities and articulate argumentation among students.

Frequent interactions, both individually and in groups, yielded positive feedback and clear indicators of improved language proficiency, heightened enthusiasm, active participation, and increased confidence in English usage. The assessment, including writing exercises and computer-based activities, revealed enhanced ESL reading proficiency through active engagement, leading to expanded vocabulary and precise articulation.

Through systematic evaluation, I improved students' reading skills with interactive exercises and a computer-based program. Substantial enhancements included identifying main ideas, extracting relevant

information, and expanding vocabulary, demonstrating heightened comprehension of intricate texts.

The paragraph emphasizes the positive influence of the hypermedia-based language learning course in cultivating and enhancing students' reading abilities. In conclusion, our 60-day study on personalized computer-mediated ESL education for Pakistani learners highlights the significant impact of tailored pedagogical methods. The observed improvements in motivation, language proficiency, and reading skills affirm the efficacy of personalized approaches, contributing valuable insights to the discourse on effective language education methodologies.

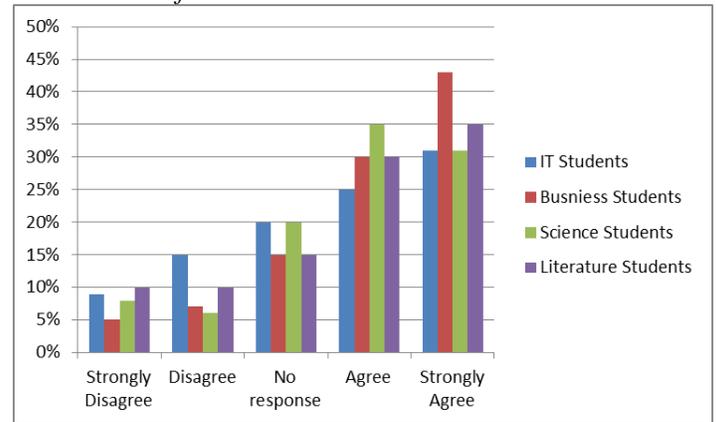
Effectiveness of Hypermedia-Based Language Learning Modules: A Department-Wise Survey Analysis

This research segment focused on the second research question: "How effective are hypermedia-based language learning modules in enhancing ESL proficiency among Pakistani students, and how can optimization strategies improve learning outcomes?" Data was gathered from students across IT, Business, Science, and Literature departments through well-structured questionnaires with ten variables. Utilizing the Liker scale and quantitative methods in Excel, the data was analyzed to assess significant differences, aligning with hypothesized population dynamics. The selected variables provided insights into various aspects of students' language learning experiences with hypermedia-based modules, revealing their perceptions, attitudes, experiences, and motivation.

The Content of Modules is Reliable

Figure 3 illustrates students' perceptions of module content reliability across four departments. Results indicate a higher percentage agreeing or strongly agreeing, emphasizing the positive perception of content reliability. Minimal instances of strong disagreement affirm the effectiveness of the modules in providing trustworthy educational materials, enhancing ESL proficiency among Pakistani students.

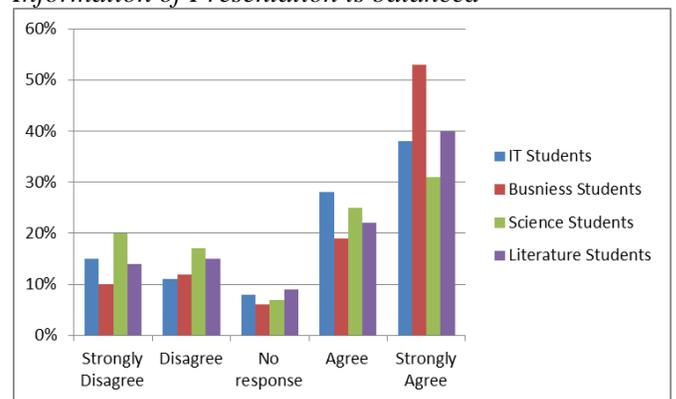
Figure 3
The Content of Modules is Reliable



Information of Presentation is balanced

In Figure 4, Business students demonstrated a noteworthy trend, with over 50% strongly agreeing with question no. 2, surpassing counterparts in other departments (40% to 50% agreement). Conversely, Science students recorded the highest agreement level at approximately 20%. Responses for question no. 2 were overwhelmingly positive, indicating a perceived balance and engagement in content presentation. Survey results suggest the effectiveness of hypermedia-based language learning modules in meeting diverse educational needs.

Figure 4
Information of Presentation is balanced

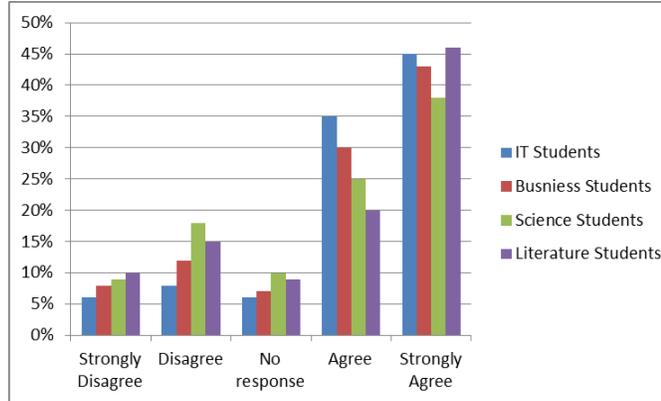


Efficiency and Simplicity in Grammar Learning Procedure

In Figure 5, 45% of students strongly agreed with the effectiveness of learning grammar through the modules, with IT students comprising the largest group (35% agreement). Only 10% of students

provided no response. Overall, a majority across departments expressed strong agreement, suggesting the success of hypermedia-based language learning modules in facilitating grammar learning.

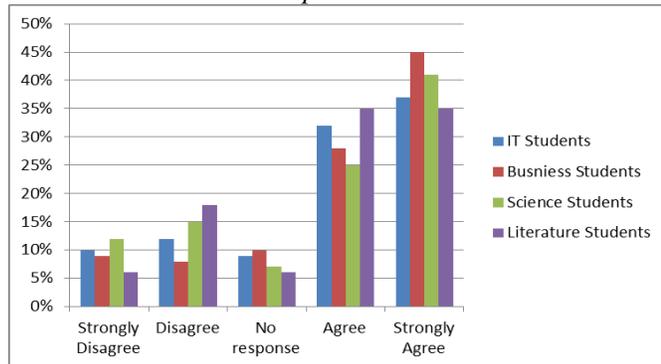
Figure 5
Efficiency and Simplicity in Grammar Learning Procedure



Concepts and Vocabulary Presented in Course is Relevant to Learners' Capabilities

Figure 6 reveals participant responses on course concepts and vocabulary relevance. Approximately 10% strongly disagreed, while 35% to 45% strongly agreed, emphasizing the efficacy of hypermedia-based language learning. Up to 35% simply agreed, reinforcing content alignment with language learning abilities. A smaller percentage (5% to 10%) provided no response. In summary, the majority expressed positive views on course relevance, indicating the modules' effectiveness in creating a favorable learning environment.

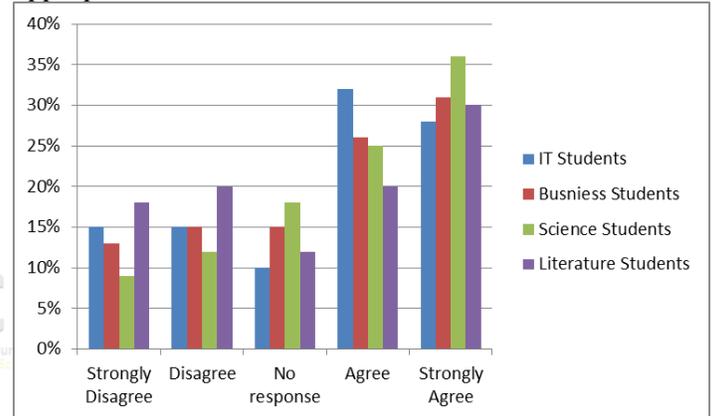
Figure 6
Concepts and Vocabulary Presented in Course is Relevant to Learners' Capabilities



Course Ware Focus on Four Skills is Balanced and Appropriate

Figure 7 shows predominantly positive responses to the courseware, with over 35% of Science students strongly agreeing and approximately 30% from other departments. The second-highest agreement relates to a balanced focus on language skills. Notable fluctuations, particularly a 20% disagreement from Literature students, suggest the importance of considering departmental preferences. In conclusion, variations highlight the need for tailored approaches to accommodate diverse academic perspectives.

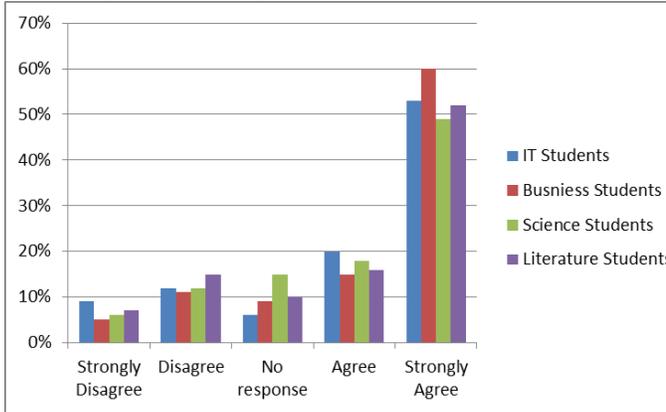
Figure 7
Course Ware Focus on Four Skills is Balanced and Appropriate



Hypermedia Course Focus on Conceptual Learning Instead of Memorizing

In Figure 8, results show a significant preference for conceptual learning over memorization in the hypermedia course, with a notable 50% strongly agreeing, notably led by 60% of Business students. Conversely, strong disagreement dropped to 5%. This trend, while dominant, suggests a minority holding dissenting opinions, emphasizing the importance of understanding diverse learning preferences for optimal language learning module design.

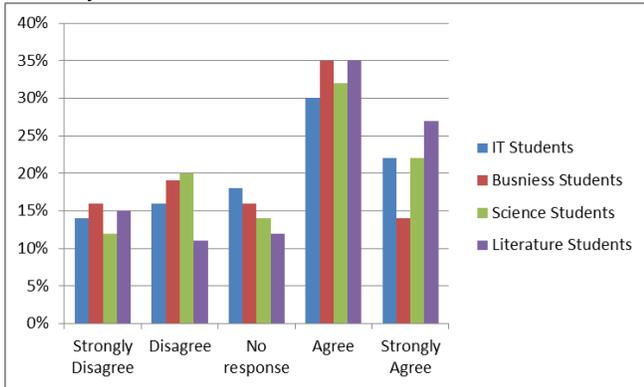
Figure 8
Hypermedia Course Focus on Conceptual Learning Instead of Memorizing



The Design is Simple and does not Burden Student's Memory

Figure 9 highlights the highest agreement at 35%, with literature students as the second-highest group (27% strongly agreeing, 35% agreeing). Fluctuations, notably a 20% disagreement among science students, were observed.

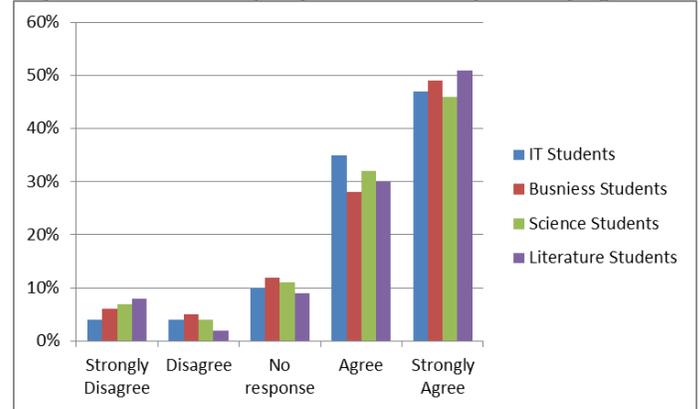
Figure 9
The Design is Simple and does not Burden Student's Memory



Objectives are clearly explained in every unit's page

In Figure 10, approximately 5% of 100 participants strongly disagreed, while around 50% strongly agreed that objectives are clearly explained on every unit's page. The second-highest group comprised participants who simply agreed, with 30% being IT students. The smallest group, at around 5%, disagreed, and 10% did not respond.

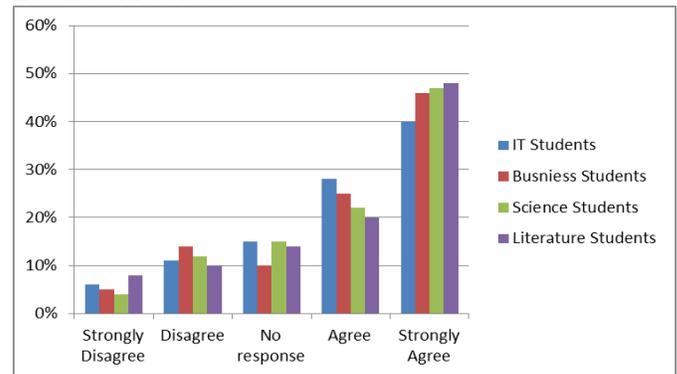
Figure 10
Objectives are clearly explained in every unit's page



Self-learning-based Courseware, Independent of External Materials

Figure 12 reveals a significant proportion (30% to 40%) of students either agreeing or strongly agreeing with the statement, indicating widespread satisfaction with the hypermedia modules. Science students, however, displayed the highest percentage (approximately 15%) in disagreement or non-response, suggesting distinct factors or preferences influencing their satisfaction levels. Despite this, the overall trend emphasizes the majority expressing satisfaction, with a minority indicating dissatisfaction or remaining undecided. Further analysis, especially among science students, could provide valuable insights for enhancing the educational experience and ensuring broader satisfaction.

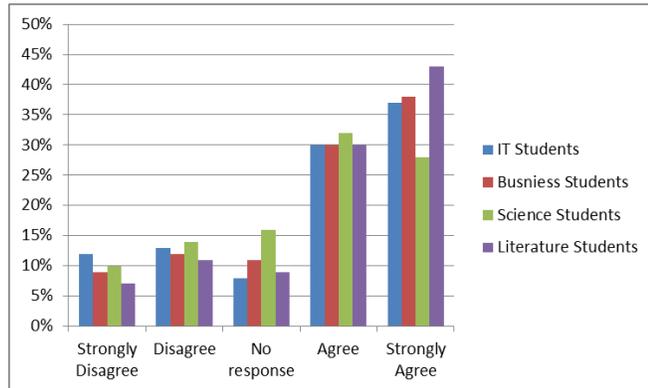
Figure 11
Self-learning-based Courseware, Independent of External Materials



Students are You Satisfied by Using the Hypermedia Modules

In Figure 12, data reveals that a substantial proportion of students (30% to 40%) either agreed or strongly agreed with the statement, indicating widespread satisfaction with the hypermedia modules. Notably, science students exhibited the highest percentage (approximately 15%) disagreeing or not responding, suggesting unique factors or preferences influencing their satisfaction levels. Despite this, the overall trend highlights the majority of students expressing satisfaction with the hypermedia modules, while only a minority expressed dissatisfaction or remained undecided. Further analysis, especially among science students, could offer valuable insights for enhancing the educational experience and ensuring broader satisfaction.

Figure 12
Students are You Satisfied by Using the Hypermedia Modules

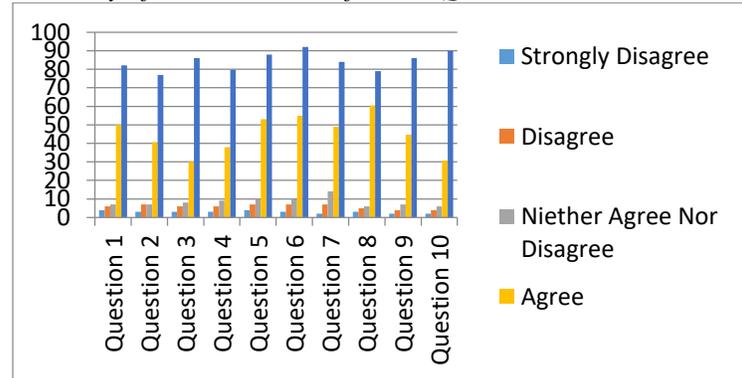


Summary of Overall Results for Ten Questions

Formulating 10 questions for hypermedia ESL courseware assessment aimed to gauge students' responses on design, environment, curriculum, content, learning theories, and structure. Results (Figure 13) show around 60% strongly agreeing with 6 questions and 50% with 8, indicating positive responses. Despite enthusiasm from students unfamiliar with multimedia learning, rural students faced operational challenges, requiring teacher assistance. Questions 7-10, focusing on skills, self-learning, hypermedia interaction, and conceptual understanding, received the highest strongly agree responses. Hypermedia's potential for exploratory

understanding, personalized learning, and bias-free material presentation is evident. Emphasizing holistic language learning aligns with Barab et al. (1997). Addressing areas like course objectives and exercises is crucial for continuous improvement, guiding educators to optimize hypermedia ESL courseware for an engaging, effective learning experience.

Figure 13
Summary of Overall Results for Ten Question



Exploring Students' Motivation within Hypermedia-Based Language Learning: Insights from Student's Reflective Notes

This section presents findings from students' reflective notes, assessing the motivation of Pakistani students in a hypermedia-based language learning course. The study aimed to explore their motivation levels and attitudes toward the program, revealing a predominant high level of motivation and enthusiasm. This remarkable engagement was notably influenced by the interactive nature of hypermedia-based modules, incorporating multimedia elements such as audios, videos, quizzes, and interactive exercises. The heightened enthusiasm positively impacted their overall perception of the course, deeming it enjoyable and captivating, as illustrated in a student reflective note.

Reflecting on my language learning journey with the hypermedia-based course, I found motivation and excitement. Interactive modules, including audios, videos, quizzes, and exercises, made each session engaging. The course design transformed language learning from memorization to practical usage, turning it into an enjoyable and effective adventure.

This experience shifted my perspective, making a challenging task an exciting journey.

The questionnaire responses indicated an increase in students' ESL proficiency confidence during the hypermedia-based language learning course. The personalized modules, allowing individualized progress and catering to diverse learning preferences, contributed to heightened self-assurance in language skills. Regular practice and feedback in the program further strengthened confidence and active participation. Students expressed intrinsic motivation, driven by personal reasons such as career advancement and effective communication, highlighting the course's autonomy and flexibility as key motivators. The following student responses provide insights into the impact of Hypermedia-Based Language Learning on Pakistani students' motivation.

Reflecting on my journey in the hypermedia-based language course, I'm amazed at how it boosted my confidence. Personalized lessons allowed me to learn at my own pace, focusing on what I needed and providing valuable practice and feedback. This approach kindled intrinsic motivation, driving me towards broader goals like a better job and effective communication. The freedom to learn on my terms, without a strict plan, made me feel responsible for my education. In essence, this course not only improved my language skills but also instilled a strong belief in myself.

The open-ended responses highlight the computer-assisted language learning program's effective, goal-oriented approach in sustaining student motivation. Clear module objectives and progress tracking mechanisms provided purpose and direction, motivating students to surpass proficiency goals. The collaborative learning environment, including virtual forums and group activities, facilitated idea exchange and mutual encouragement, positively influencing student motivation, as expressed in reflective notes.

In reflecting on my journey through the program, I found that effective progress tracking and recognition were strong motivators, propelling me to exceed my language skills expectations. Collaborating with my peers fostered a supportive community, significantly boosting my motivation. The clear objectives stimulated my critical thinking, encouraging deeper analysis and enhancing my

overall learning experience. This comprehensive approach not only improved my language skills but also encouraged my critical thinking and collaborative engagement. It emphasizes the significance of structured goals, recognition, community, and critical thinking in sustaining motivation and achieving learning success.

The students appreciate the collaborative and supportive learning environment facilitated by the hypermedia-based program, emphasizing the significance of peer interaction in sustaining motivation. Virtual platforms, like discussion forums and group activities, serve as channels for knowledge exchange and mutual encouragement, fostering a sense of belonging and shared goals that significantly enhance intrinsic motivation. Findings from the open-ended questionnaire reveal high levels of motivation, enthusiasm, confidence, and intrinsic drive among Pakistani students using the hypermedia-based computer-assisted language learning program for ESL proficiency enhancement. The personalized and interactive course, within a supportive learning environment, underscores the potential of hypermedia-based modules in ESL proficiency enhancement and contributes to effective language learning strategies for diverse student populations.

DISCUSSION

This study rigorously explores the impact of hypermedia-based modules on ESL students' language skills, employing a comprehensive approach that integrates quantitative and qualitative analyses. Quantitative evidence, such as pretest-to-posttest scores, reveals significant improvements in diverse language competencies. Qualitative insights from teacher's reflective notes validate these improvements, while surveys, students' reflexive notes, and questionnaires provide additional layers of validation, offering insights into overall trends and individual experiences. The findings demonstrate substantial growth in writing abilities, marked by a shift from disjointed compositions to organized essays, supported by improvements in sentence structure and vocabulary. Similarly, enhancements in reading skills are evidenced by proficiency in deciphering intricate texts, aligning with teacher's notes. The study also highlights significant growth in listening and speaking proficiency, corroborated by

educators' observations and students' reflective notes. Survey outcomes further validate the effectiveness of hypermedia modules, supported by qualitative accounts emphasizing reliability, effectiveness, and satisfaction with the courseware. In conclusion, this research underscores the transformative potential of hypermedia-based modules in contemporary ESL education, affirming the efficacy of technology-driven personalized learning approaches.

CONCLUSION

This study highlights the effectiveness of interactive modules in empowering ESL students through hypermedia courseware, emphasizing the practical significance of interactive learning and the importance of student autonomy. The research recommends prioritizing the integration of interactive features in ESL programs, recognizing their essential role in software design. Motivated by technology's pivotal role in education, the study encourages ESL educators to leverage multimedia technology for enhanced language acquisition. The comprehensive evaluation, utilizing methodologies such as pretest-posttest analyses, surveys, reflective notes, and open-ended questionnaires, validates the positive impact of implemented strategies. Results demonstrate proficiency enhancement across language skills and heightened motivation levels among students, affirming the potential of interactive hypermedia courseware in ESL education and its impact on broader cognitive competencies. The integration of learner-controlled and interactive modules within software design is crucial, acknowledging the profound impact of multimedia technology on education.

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APPENDIX A

QUESTIONNAIRE

Name of student ----- Semester -
 ----- Department -----
 ----- College -----

Circle the response that best characterizes how you feel about the statement for each of the questions below, where 1 =Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, and 5=Strongly Agree

	Strongly Disagree	Disagree	No response	Agree	Strongly Agree
1. The content of modules is reliable	1	2	3	4	5
2. Information of presentation is balanced	1	2	3	4	5
3. Procedure of grammar learning is effective and easy	1	2	3	4	5
4. Course ware focus on four skills is balanced and appropriate	1	2	3	4	5
5. The courseware is based on Personalized-learning, without help of other learning book Materials.	1	2	3	4	5
6. Hypermedia course focus on conceptual learning instead of memorizing	1	2	3	4	5
7. The design is simple and does not burden student's memory	1	2	3	4	5
8. Objectives are clearly explained in every unit's page	1	2	3	4	5
9. The courseware is based on self-learning, without help of other learning book Materials.	1	2	3	4	5
10. You are satisfied by using the hypermedia modules	1	2	3	4	5

