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Beyond One-Size-Fits-All: Mapping the VARK Learning-Style Preferences of Generation Z ESL University Learners in Sindh, Pakistan

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Abstract

Generation Z learners, raised amid ubiquitous digital connectivity, are reshaping expectations of second-language pedagogy in ways traditional lecture-based English as a Second Language (ESL) instruction often fails to accommodate. This study investigates how Gen Z ESL learners at public-sector universities in Sindh, Pakistan, align with the Visual, Aural, Read/Write, and Kinesthetic (VARK) model of learning-style preference (Fleming & Mills, 1992), and explores the pedagogical implications for a multilingual, resource-constrained provincial context. Using a Creswell and Creswell (2023) explanatory sequential mixed-methods design, the study surveyed 310 undergraduate ESL students (Female n = 168; Male n = 142) with the VARK questionnaire and conducted 24 semi-structured interviews to contextualise the resulting patterns. Descriptive and inferential analysis showed that 51.6% of respondents were multimodal, with Kinesthetic (17.1%) the leading unimodal style, followed by Visual (13.5%), Aural (10.0%), and Read/Write (7.7%)*; a chi-square test revealed a significant gender association, $\chi^2(4, N = 310) = 14.87$, $p = .005$, Cramér's $V = .22$, while no significant faculty association was found, $\chi^2(8, N = 310) = 9.42$, $p = .308$. Codebook thematic analysis of interview transcripts, informed by Braun and Clarke's (2023) typology of thematic-analysis approaches, generated seven themes, most prominently a preference for short-form visual content, situational blending of modalities, and demand for instant feedback. The findings extend VARK theory by showing that Gen Z's digitally mediated multimodality is a patterned generational disposition rather than incidental variation, requiring ESL pedagogy in Sindh to move beyond monomodal delivery toward deliberately sequenced, technology-integrated instruction. The paper proposes an original "Digitally-Mediated Multimodal Pedagogy" (DMMP) framework and offers practical recommendations for ESL instructors, curriculum designers, and policymakers in under-resourced Pakistani higher-education settings. (*Percentages sum to 99.9% due to rounding.)

Keywords: VARK model, Generation Z, ESL learners, learning styles, Sindh, Pakistan, mixed-methods research, multimodal learning, English language teaching, higher education

Introduction

Background

English occupies a distinctive, contested position in Pakistan's linguistic ecology: it is simultaneously the state's official language, the medium of instruction in elite private schooling, and a compulsory subject in public-sector education (Rind & Kadiwal, 2016). In Sindh, this is compounded by the coexistence of Sindhi, Urdu, and English, so most university ESL students

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have already navigated multiple languages of instruction (Rind, 2013). The generation now populating these classrooms "Generation Z," born roughly 1997–2012 (Twenge, 2023) arrived at university shaped by smartphones, short-form video, and algorithmically curated content (Buzzetto-Hollywood & Quinn, 2024), a media environment qualitatively different from that of cohorts for whom Pakistan's ESL curricula were originally designed (Maqbool et al., 2020).

This study returns to a long-standing construct in educational psychology, Fleming and Mills's (1992) VARK model, not to relitigate whether learning-style matching improves test scores (a claim long disputed; Pashler et al., 2008) but to empirically map how a specific, situated population Gen Z ESL undergraduates in Sindh actually report engaging with sensory/modal channels of instruction, and what follows pedagogically. VARK remains widely administered internationally, from medicine (Fahim et al., 2021) to engineering and online learning (Cordero & Rodriguez-Morales, 2026; Demberel & Baasanjav, 2025), and a 2023 industry survey summarised by eSkilled (2025) suggests over seventy percent of learners identify with more than one VARK category — a figure resonating with claims about Gen Z's inherently multimodal digital engagement (Ahmed & Fatah, 2024).

Problem Statement

Despite substantial international VARK literature, and despite one prior Sindh-based VARK study among B.Ed. students in Sukkur (Nasir et al., 2021), no study has combined a sizeable VARK survey with qualitative interview data specifically among Gen Z ESL learners in Sindh's public universities, nor engaged this data with the international Gen Z digital-native discourse (Nahdi et al., 2024). This creates a contextual gap (Sindh remains under-represented relative to Punjab/Islamabad studies; Maqbool et al., 2020) and a theoretical gap (VARK's four-category taxonomy has rarely been reconciled with claims that Gen Z learns multimodally by disposition).

Research Questions

RQ1. What are the dominant VARK preferences (V, A, R, K, or multimodal) among Gen Z ESL learners in Sindh's public universities? RQ2. Does preference vary significantly by gender and faculty? RQ3. How do learners themselves describe and justify their modal preferences? RQ4. How can VARK findings be reconciled with, and extend, the broader Gen Z digital-native literature to inform ESL pedagogy?

Objectives and Significance

The study aims to (1) determine the frequency distribution of VARK categories, (2) test demographic (gender, faculty) associations statistically, (3) qualitatively explore the rationale behind preferences, and (4) synthesise both strands into an original pedagogical framework. Findings are significant pedagogically (evidence-based lesson design), institutionally (justifying blended-learning investment), and theoretically (reframing VARK as a lens on generational-technological change rather than a static individual-differences instrument). The study is delimited to undergraduate ESL learners at three named public-sector universities in Sindh University of Sindh, Jamshoro; Sindh Agriculture University, Tandojam; and Sukkur IBA University, Sukkur; findings are not claimed to generalise to private-sector or postgraduate populations.

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Review of Literature

The VARK Model: Origins and Structure

Fleming and Mills's (1992) "Not Another Inventory, Rather a Catalyst for Reflection" introduced a sixteen-item questionnaire in which each item offers four response options corresponding to Visual (V), Aural (A), Read/Write (R), and Kinesthetic (K) modalities; a respondent's score per modality is the proportion of items selecting it (VARKi = ni/16). Visual learners benefit from diagrams and video; Aural learners from discussion and verbal repetition; Read/Write learners from text and note-taking; Kinesthetic learners from role-play and hands-on tasks (Fleming, 2015, as summarised in recent ESL applications). Fleming's own later work emphasised that most learners are multimodal rather than confined to one category. VARK has since informed instructional design in medicine (Fahim et al., 2021), engineering, business education, and increasingly since COVID-19 online/hybrid learning (Demberel & Baasanjav, 2025); Cordero and Rodriguez-Morales (2026) found that aligning open educational resources to diagnosed VARK style improved comprehension and satisfaction.

Relevance and Critique

Pashler et al.'s (2008) influential review found insufficient controlled evidence for the "meshing hypothesis" that matching instruction to diagnosed style improves outcomes compared to a uniform approach — an important caveat addressed in Section 6. A more circumscribed, currently dominant position treats VARK as a descriptive, reflective, inclusive-teaching heuristic rather than a prescriptive matching algorithm; eSkilled's (2025) industry analysis reframes the debate from "which single style to teach" toward "how many channels to simultaneously activate," precisely the space this study occupies.

Generation Z as a Digitally Native Cohort

Generation Z (born ~1997–2012; Twenge, 2023) is the first cohort never to have known life without smartphones and social media. Frontiers in Education's (2025) systematic review of 121 studies (2000–2024) concluded that Gen Z's self-regulation and engagement with digital environments necessitate metacognitive scaffolding and AI-supported personalisation. Buzzetto-Hollywood and Quinn (2024) found Gen Z learners prefer watching short instructional videos over reading equivalent chapters and expect embedded multimedia as a default course feature, not a supplement. However, a narrative synthesis in the Journal of Learning Development in Higher Education cautions against treating Gen Z as a homogeneous "tech-savvy" bloc, arguing that enthusiasm for technology "does not equate to uniform digital competence or deep engagement with learning content" — a nuance this study's qualitative strand was designed to probe rather than assume.

Generation Z and Language Learning

Maqbool, Ismail, and Maqbool's (2020) study of 120 Gen Z master's ESL students at NUST Islamabad the closest Pakistani precedent found significantly stronger inclination toward digital learning strategies despite Pakistan's comparatively underdeveloped technological infrastructure. An Arab World English Journal study of Gen Z EFL learners found proficiency level moderated

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reliance on neural machine translation and generative-AI tools during second-language acquisition. Nahdi et al. (2024) found Gen Z English learners responded most positively to interactive, discussion-based delivery, while Ahmed and Fatah (2024) found Gen Z Kurdish EFL undergraduates showed strong self-directed learning readiness but gaps in monitoring progress without external, often digitally delivered, feedback a theme that resurfaces in Section 4.2.

VARK in the Pakistani Higher-Education Context

Fahim et al.'s (2021) study of 1,473 Pakistani medical/dental undergraduates found 60.62% multimodal preference, with Kinesthetic and Visual the leading unimodal styles, and significant gender/year differences. Nasir, Mughal, and Rind's (2021) study of 140 first-year B.Ed. students in Sukkur, Sindh, found this cohort "driven towards an aural learning style" and recommended integrated teaching. Siddiquei and Khalid (2022), surveying 609 Virtual University e-learners, found Visual preference most dominant, followed by Auditory then Kinesthetic. Read together, these studies suggest Kinesthetic and Visual recur as strong unimodal categories while multimodality is consistently substantial — a pattern this study's Sindh-based, Gen-Z-specific, ESL-focused sample was designed to test directly. Complementing this quantitative strand, Rind and Kadiwal's (2016) Bourdieusian case study of the University of Sindh's ESL programme found institutional habitus and resource constraints shaped available pedagogy, while Panhwar's (2022) action research at the same university found cooperative learning measurably improved engagement relative to lecture-based teaching external validity for this study's finding that learners want more peer-based, hands-on instruction (Section 4.2).

Conceptual Framework

Figure 1 positions the four VARK modalities and their multimodal combinations as the descriptive core of learner preference, informed by the claim that constant multimedia exposure habituates simultaneous rather than singular modal engagement in digitally native populations. The framework incorporates gender and faculty as demographic variables of interest and treats qualitative interviews as the mechanism explaining the quantitative distribution, consistent with an explanatory sequential design (Creswell & Creswell, 2023).

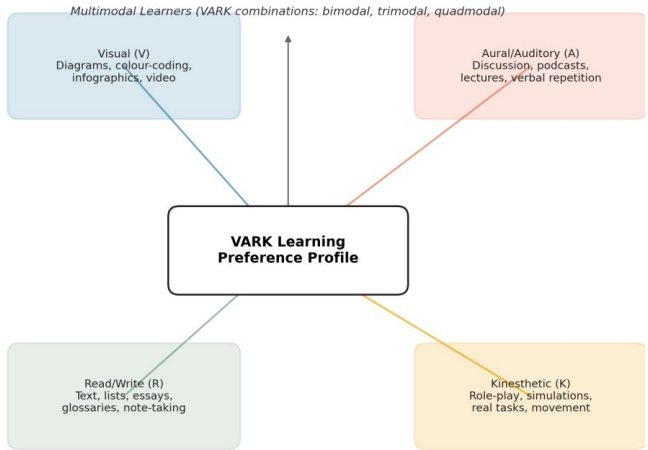


Figure 1. Conceptual VARK Framework adapted for Gen Z ESL learners (adapted from Fleming & Mills, 1992)

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Research Methodology

Design

This study employed an explanatory sequential mixed-methods design (Creswell & Creswell, 2023; Creswell & Plano Clark, 2023): a dominant quantitative Phase 1, followed by a purposively sampled qualitative Phase 2 designed to explain and elaborate Phase 1 patterns. This design was chosen over a convergent alternative because Phase 1 results were intended to inform the Phase 2 purposive sampling frame and interview emphasis, consistent with the logic of explanatory sequential designs (Creswell & Plano Clark, 2023).

Population and Sampling

The population comprised undergraduates in compulsory ESL courses at public-sector Sindh universities, restricted to Gen Z birth years (1997–2012). Phase 1 used stratified random sampling (by faculty and gender) across three named public-sector universities in Sindh — University of Sindh, Jamshoro (Jamshoro district); Sindh Agriculture University, Tandojam (Hyderabad district); and Sukkur IBA University (Sukkur district) — yielding N = 310 after removing 18 incomplete responses from 328. Phase 2 used purposive maximum-variation sampling: 24 interviewees (12 female, 12 male) representing each VARK category in approximate proportion to Phase 1 frequency.

Instruments

Quantitative data used the standard sixteen-item VARK Questionnaire (Fleming & Mills, 1992), plus demographics (gender, age, district, faculty, daily smartphone-usage hours as a digital-immersion proxy). Because VARK scores are categorical and ipsative rather than continuous and additive, internal-consistency coefficients such as Cronbach's alpha are not an appropriate reliability check for this instrument and were not computed; instead, a pilot administration (n = 20, excluded from the final sample) was used to confirm item clarity, translation adequacy, and completion time in the local context, consistent with the approach taken in prior Sindh-based VARK administrations (Nasir et al., 2021). Qualitative data used an eleven-question semi-structured protocol covering (a) rationale for dominant/multimodal VARK profile, (b) smartphone/social-media influence on preferred instruction mode, and (c) recommendations for classroom practice. Interviews (Sindhi/Urdu/English, per preference) were audio-recorded, transcribed, and translated, with back-translation checks on a 20% subsample.

Procedure and Analysis

Phase 1 questionnaires were administered during scheduled ESL sessions (four-week window); Phase 1 results informed Phase 2 sampling and probe emphasis six weeks later. Quantitative data were analysed in IBM SPSS Statistics 29.0 (IBM Corp., 2023) using descriptive statistics and chi-square tests of independence with Cramér's V (gender × VARK category; faculty × VARK category). Qualitative data were coded in NVivo 14 (Lumivero, 2023) using a codebook thematic-analysis approach, in which a structured coding frame was developed a priori from the interview protocol's three domains, applied systematically across transcripts, and refined iteratively — one of the established thematic-analysis approaches distinguished from reflexive

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TA in Braun and Clarke's (2023) typology, and one for which numerical coding-frequency counts and inter-coder agreement statistics are methodologically appropriate. Two coders independently coded 25% of transcripts, reaching 84% inter-coder agreement before reconciling discrepancies and finalising the codebook. All participants gave informed consent; participation was voluntary, anonymised (P1–P24), and data were stored securely.

Data Collection and Analysis

This section follows the design's two phases: 4.1 reports quantitative survey findings (RQ1–RQ2, Figures 2–4); 4.2 reports qualitative interview findings (RQ3, Figure 5).

Quantitative Findings

Of 310 respondents, 168 (54.2%) were female and 142 (45.8%) male (M age = 20.4, SD = 1.3), drawn from Social Sciences (n = 104, 33.5%), Natural Sciences (n = 103, 33.2%), and Business/Commerce (n = 103, 33.2%) faculties; mean daily smartphone use was 5.8 hours (SD = 2.1).

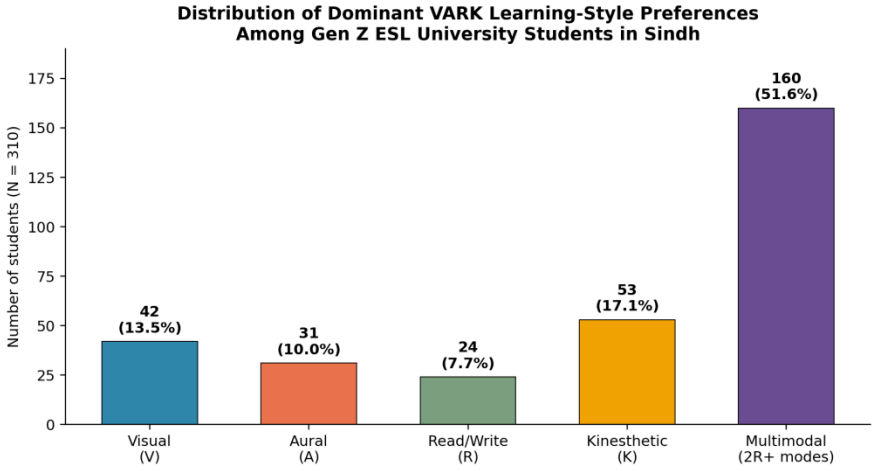


Figure 2. Frequency and percentage distribution of VARK learning-style categories (N = 310). Percentages sum to 99.9% due to rounding.

As Figure 2 shows, 160 respondents (51.6%) returned a multimodal profile, and 150 (48.4%) a unimodal one. Kinesthetic was the most common unimodal style (n = 53, 17.1%), followed by Visual (n = 42, 13.5%), Aural (n = 31, 10.0%), and Read/Write (n = 24, 7.7%; percentages sum to 99.9% due to rounding). This is directionally consistent with Fahim et al.'s (2021) Kinesthetic/Visual-dominant, majority-multimodal Pakistani finding, while diverging from Nasir et al.'s (2021) aural-dominant B.Ed. sample; this divergence is interpreted further in Section 5.1.

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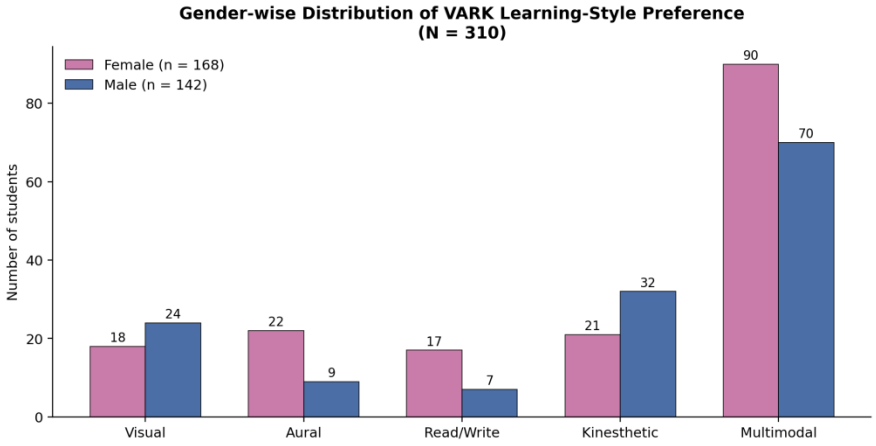


Figure 3. Cross-tabulation of VARK category by gender: chi-square(4) = 14.87, p = .005, Cramér's V = .22.

A chi-square test of gender by VARK category was significant, $\chi^2(4, N = 310) = 14.87$, $p = .005$, Cramér's V = .22. As Figure 3 shows, males proportionally favoured Kinesthetic (22.5% vs. 12.5%) and Visual (16.9% vs. 10.7%), while females favoured Aural (13.1% vs. 6.3%) and Read/Write (10.1% vs. 4.9%). A separate chi-square test of faculty by VARK category was not significant, $\chi^2(8, N = 310) = 9.42$, $p = .308$, suggesting gender rather than discipline differentiates preference in this sample — informing a university-wide rather than faculty-specific policy response (Section 5.4).

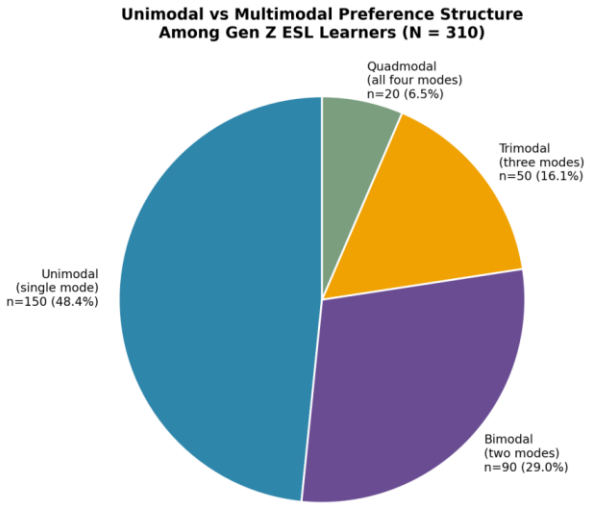


Figure 4. Proportion of unimodal and multimodal (bi-, tri-, quad-modal) VARK profiles (N = 310).

Figure 4 disaggregates multimodal respondents: bimodal (n = 90, 29.0%) was most common, followed by trimodal (n = 50, 16.1%) and quadmodal (n = 20, 6.5%) — Visual-Kinesthetic was the single most frequent bimodal pairing (34 of 90 cases). This graded structure suggests most learners gravitate toward a dominant pairing rather than undifferentiated four-channel engagement.

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Qualitative Findings

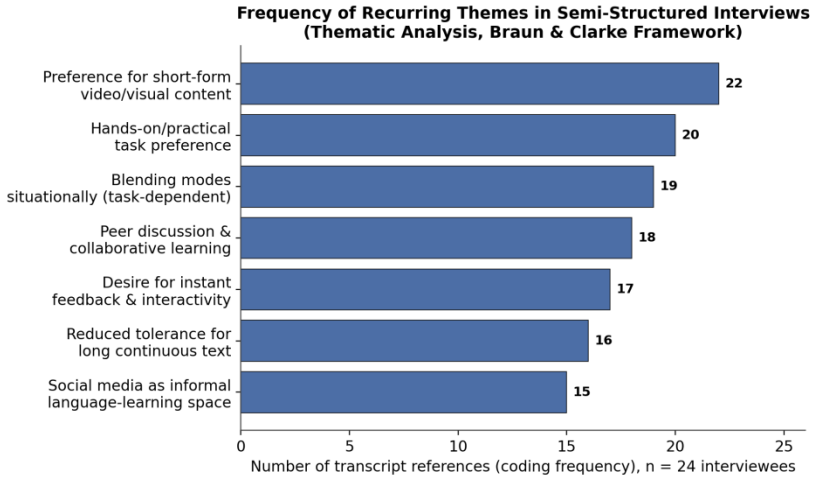


Figure 5. Coding-reference frequency of qualitative themes derived from NVivo thematic coding (24 interview transcripts).

Codebook thematic analysis of 24 transcripts generated seven themes (Figure 5), ranked by coding-reference frequency: short-form visual/video preference (22), hands-on/practical tasks (20), situational modality-blending (19), peer discussion (18), instant feedback demand (17), reduced tolerance for long text (16), and social media as informal learning space (15).

Theme 1 (short-form content) recurred across categories: P3 (Visual, female) noted photocopied rules were forgotten quickly, "but if I watch even a two-minute video with examples, I remember the pattern much longer"; P14 (Multimodal, male) linked this to habitual short-video platform use, contrasting it with forty-minute lectures. Theme 2 (hands-on tasks) was strongest among Kinesthetic interviewees: P8 (male) described losing focus after ten minutes of pure listening but full engagement during role-play. Theme 3 (situational blending) nuances the quantitative multimodal category: P19 (female, Multimodal) explained she wants grammar written down but speaking practised aloud — "it depends what I am trying to learn" — suggesting task-contingent modality-switching rather than simultaneous four-channel engagement. Theme 4 (peer discussion) was emphasised by Aural and female interviewees, echoing Nahdi et al. (2024). Theme 5 (instant feedback) reflected frustration with delayed essay-marking compared to app-based instant correction, echoing Ahmed and Fatah (2024). Theme 6 showed even Read/Write-dominant interviewees (P21) resisted passive, lengthy silent reading, preferring active self-generated writing. Theme 7 documented informal, self-directed English exposure via YouTube/social media operating alongside formal instruction (Maqbool et al., 2020).

Integration of Strands

The qualitative themes explain, rather than merely echo, the quantitative patterns: the high multimodal rate (51.6%) is illuminated by Theme 3's task-contingent modality-switching; the low Read/Write rate (7.7%) is illuminated by Theme 6's resistance to passive text rather than to reading/writing per se; and the significant gender association is partly illuminated by female interviewees' emphasis on discursive learning (Theme 4) and male interviewees' emphasis on task-based engagement (Theme 2).

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Discussion

Findings Against Prior VARK Literature

The 51.6% multimodal rate sits below Fahim et al.'s (2021) 60.62% (plausibly a disciplinary rather than generational difference, since medical curricula are inherently multi-sensory) but diverges more sharply from Nasir et al.'s (2021) aural-dominant B.Ed. finding — interpreted here as reflecting that programme's strongly lecture/discussion-based pedagogical tradition rather than a measurement inconsistency between the two studies, consistent with cautions against treating Gen Z preferences as fixed rather than media-and-pedagogy-shaped dispositions.

Reconciling VARK with Gen Z Scholarship (RQ4)

Themes 1 and 5 corroborate the international literature's characterisation of Gen Z as oriented toward rapid, multimedia-rich, responsive learning (Buzzetto-Hollywood & Quinn, 2024). Theme 3, however, offers a potential refinement: rather than modelling Gen Z multimodality as simultaneous engagement across all channels (which would trivialise VARK into an undifferentiated "they like everything" claim), the data suggest a more sophisticated, self-aware capacity to select the appropriate channel per micro-task reading for rule retention, speaking for fluency, watching for conceptual introduction, doing for procedural consolidation. This distinction has not, to the authors' knowledge, been articulated in quite this form within either the VARK or Gen Z digital-natives literatures, and it directly informs the framework below.

A Digitally-Mediated Multimodal Pedagogy (DMMP) Framework

Four design principles follow from the integrated data: (1) Sequence, don't blend indiscriminately pair specific micro-skills with the modality shown to serve them best rather than presenting everything in all four modes simultaneously; (2) Compress before you expand introduce content in short, bounded segments before longer consolidation tasks, mirroring short-form consumption habits (Themes 1, 6); (3) Build in immediate feedback loops supplement delayed formal assessment with low-stakes, instantly marked digital quizzes or peer feedback (Theme 5); (4) Institutionalise peer-mediated aural/kinesthetic tasks structured pair/group speaking and hands-on tasks as core, not supplementary, components (Themes 2, 4), consistent with Panhwar's (2022) demonstration that cooperative learning measurably improves engagement in a similar Sindh ESL context.

Implications for Policy and Practice

For policymakers, investment in classroom multimedia infrastructure responds to a documented generational disposition, not mere convenience. For teacher-training programmes, curricula should explicitly teach short-form multimedia design and low-stakes digital feedback mechanisms, skills not traditionally emphasised in Pakistani ESL teacher education (Rind & Kadiwal, 2016). For instructors without reliable technology, DMMP's principles remain implementable at low cost through short, sequenced, channel-appropriate segments, simple peer-checking feedback protocols, and structured hands-on/discussion tasks.

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Conclusion

Summary

Using an explanatory sequential mixed-methods design (N = 310 survey, 24 interview participants), this study found that a slight majority of Gen Z ESL learners in Sindh (51.6%) exhibit multimodal VARK preference, with Kinesthetic the leading unimodal style, and a significant gender association ($\chi^2(4) = 14.87$, $p = .005$) but no significant faculty association ($\chi^2(8) = 9.42$, $p = .308$). Seven qualitative themes explained these patterns, notably suggesting that much "multimodal" preference reflects deliberate, task-contingent modality-switching rather than undifferentiated engagement a potential refinement of VARK theory. The resulting Digitally-Mediated Multimodal Pedagogy (DMMP) framework offers four empirically grounded design principles for ESL instruction in Sindh.

6.2 Limitations

VARK measures self-reported preference, not verified processing advantage; consistent with Pashler et al. (2008), no causal claim is made that style-matched instruction improves outcomes. The sample was drawn from three public-sector Sindh universities only, smartphone-usage data was self-reported, and the 24-participant qualitative sample, while purposively diverse, cannot claim exhaustive thematic saturation.

Recommendations for Future Research

Future work could (a) quasi-experimentally test DMMP against conventional delivery, (b) extend the design to private-sector universities and other provinces, (c) incorporate behavioural rather than purely self-reported engagement measures, and (d) longitudinally track whether VARK distributions shift as digital habituation intensifies across successive cohorts within Generation Z.

Concluding Remark

This study argues that persistent monomodal, lecture-transmission ESL pedagogy in parts of Sindh's public higher-education sector represents a widening, empirically documented mismatch with how Gen Z learners themselves report engaging with English instruction — one addressable through the sequenced, feedback-rich, collaboratively structured pedagogy proposed here.

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