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Decoding her learning mind: Analyzing female business undergraduates' learning styles through the Felder-Silverman model

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Abstract

Investigating female learning styles of business undergraduates in Sri Lanka is a nuanced idea with limited direct research, as the focus has been on Science, Technology, Engineering, and Mathematics (STEM) education. This study analyzed the learning styles of female students studying English as a Second Language (ESL) in a non-state university. To analyze gender-based learning preferences among business students and to recommend teaching methods appropriate for female students, a sample of 100 female students from a non-state business Faculty completed the Index of Learning Style (ILS) questionnaire, and the scores obtained for all four dimensions were recorded. The findings revealed predominantly balanced tendencies across several learning style dimensions, indicating flexibility among learners in adapting to different modes of learning. However, comparatively stronger tendencies were observed in the visual dimension, where 13% of students demonstrated strong visual preferences, and 37% demonstrated moderate visual preferences for content presentation. This highlights that the lessons should considerably incorporate videos, color-coded materials, flowcharts, graphics, diagrams, and demonstrations over written or spoken explanations. Less polarization around dimensions may have stemmed from a curriculum that emphasizes applied skills, such as case analysis and teamwork, often present in the business curricula, leading to more balanced results. Future research could focus on identifying male preferences, which necessitates a comparative analysis across genders. Additionally, learning style identification can be applied across institutions and disciplines (e.g., Business vs. Engineering) as an extension of the current work.

Keywords: Business undergraduates, Felder Silverman learning style model, female learning styles, non-state university

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Introduction

Research suggests that the identification of a student's learning style can lead to improved language outcomes. Dunn and Dunn (2009) illustrated that motivation and engagement of students improve with instructional techniques that complement learning style preferences (e.g., visual, auditory, kinesthetic). This is particularly significant in an intricate subject like language learning, as retention and proficiency are primarily determined by student engagement. Moreover, Pashler et al. (2009) explained that those natural ways of processing information are supported by teaching approaches which are customized to students' learning style preferences, specifically in language acquisition, where individual preferences like listening vs. reading shape effective absorption and retention of language input. According to Oxford (2003), diverse learning preferences representing the cultural dynamics in the modern classroom should be catered to through teaching methods, which appropriately address individual learner needs to ensure effective outputs in learning. Hence, customizing teaching methods to match learning styles can motivate learners in language acquisition.

Various tools are available to assess students' learning styles, with the Felder-Silverman learning style model (FSLSM) being a popular choice due to its precision in instructional design and strong alignment with technology. Developed in 1988 by Richard Felder and Linda Silverman, the FSLSM categorizes learners based on four dimensions and views learning styles as trends rather than strict classifications. FSLSM categorizes learning styles into four dimensions: Active/Reflective, Sensory / Intuitive, Visual/Verbal, and Sequential/Global. Taheri (2003) described the characteristics of learners under these four dimensions. Firstly, the learner's information processing distinction is interpreted by the Active/Reflective dimension. Active students enjoy taking on new tasks, including fresh material. Reflective learners are more introspective, displaying their independent thinking before acting on new information.

Secondly, the sensory/Intuitive dimension aims to uncover the differences in understanding or receiving information. Sensory learners like discovery learning through data and facts. Sensors apply fixed previous strategies to solve problems and are more practical and cautious. Intuitive learners often prefer exploring possibilities and relationships; they tend to innovate and dislike repetition. Intuitive learners are proficient in understanding the latest content and move faster. Next, in the Verbal/Visual dimension, visual learners prefer visual learning tools like charts, graphs, photographs, and even displays, whereas talking and listening are more accessible learning strategies for verbal learners who detest monotony and tend to be innovative. Lastly, information organization and comprehension priorities are discussed in the sequential and global dimensions. The meticulous and sequential approach to learning is characteristic of the sequential learner.

They typically structure their approach in small chunks and take a linear approach. When learning and solving problems, they make sense. As the issue develops, this learning hierarchy can begin with small pieces of knowledge and progress to a larger picture without executing all at once. The global student takes a broad view and divides it into more manageable chunks. This kind of learner combines unrelated and random facts to make sense of everything in leaps and bounds.

Gender has also been studied as a potential factor shaping learning styles, with the current study investigating the FSLSM feminine learning preferences in a business faculty at a non-state university. Liu and Liu (2023) found that women have a dominant preference for reflection than active learning while male students were being noted for their active learning preference with the differences being statistically insignificant. In the study of Shuib and Azizan (2015), a balanced distribution was observed in the sensing/intuitive, active/reflective, and sequential/global dimensions among Malaysian male and female students. Therefore, findings of Shuib and Azizan (2015) contradicts with the female preference in reflection by Liu and Liu (2023). In some studies, females have also shown a distinct preference for organizing information in a linear manner (Sequential) when their male counterparts preferred a non-linear mode (Global).

However, educators should understand that complete reliance on sequential learning or global learning is problematic and devise ways to apply them according to the lesson type (Hariyanto & Köhler, 2017). In the same study done with Kazakhstan medical students, male students were found to be reliant on visual learning over verbal, while female students were more likely to favor sequential learning over global, which again sets in contrast to the study of Shib and Azizan (2015). Further aggravating these conflicting gendered differences, Rosati (1997) claimed that Female engineering students in an American context were significantly more Reflective, Verbal, and Sequential than their male counterparts contradicting again with Shuib and Azizan (2015). These involve a comparative analysis of female-male preferences and include students with different specializations and cultural backgrounds, which may have contributed to such deviations. Therefore, it is pertinent to study a female cohort in the business educational context to delve deeper into these differences and devise methods to facilitate any gender-relevant preferences.

The FSLSM contributes to the understanding of the basis of current empirical work in global business educational contexts. A comparative analysis of learning styles using FSLSM between 297 American Business undergraduates and 39 Dominican Republic business undergraduates has shown that the majority of students have balanced learning styles in all four dimensions, with a statistically significant deviation shown in the sensing-intuitive and active-reflective dimensions (Naik et al., 2010) and in another study among 66 business students in Malaysia representing two academic programs: Diploma in Accountancy and Diploma in Marketing, identified a significant preference for visual (>90%) learning, followed by sensing and active (>80%) with a least preference shown in verbal learning style (Ghani et al., 2015).

Moreover, a comparative analysis by Green and Deel (2023), which deals with business students enrolled in hospitality courses in the USA (n=365) and Singapore (n=154), revealed distinct differences with Singaporean students showing a solid preference for active (39%), sensing (59%), visual (84%), and sequential (34%). In contrast, American students showed significant preferences for active (43%), sensing (57%), visual (67%), and sequential (47%) learning styles. In summary, research in the global context suggests that significant differences may stem from culturally distinct groups, as demonstrated through comparative studies, as well as the study conducted in the Asian context. The current work differs from previous work in its representation, with a gendered focus on female business undergraduates, addressing a significant lacuna in Sri Lankan business education.

This study used FSLSM to investigate the learning style preferences of Business students at a tertiary institute in Sri Lanka to recommend effective second language practices. Widely used in technology-enhanced learning; the FSLSM has been recommended for language acquisition due to its practicality and suitability in diverse fields (Al-Jojo, 2012). The model's usage in a business setting is deemed appropriate based on its productivity in engineering and Humanities.

There has been a significant gap in local studies assessing the learning style preferences of Business students, specifically using FSLSM. Accordingly, the present study differs from a similar study using FSLSM, which was locally conducted concerning STEM education (Wijesuriya & Dissanayake, 2021). Thus, it sets the groundwork for a comparison to investigate whether the gender-based preferences among students from similar cultural backgrounds differ in their preferences based on their field of study. The emphasis on female learning styles is essential as there is an overwhelming number of female students enrolled in Business programs in various tertiary level institutes who offer English modules as a requirement to complete the degree, it is required to separately take female learning styles to cater their specific language needs which may differ from their male counterparts. Therefore, the current study aims to analyze the learning style preferences of female business students in a non-state university and to recommend teaching methods which correspond to the specific preferences of female business students.

Methodology

Study participants

In this study, a total of one hundred female first-year undergraduates attending a business Faculty at a non-state university participated as the subjects. These students were between 20 and 25 years of age, at the B1 and B2 levels of the Common European Framework of Reference (CEFR) for languages and had met the university entry requirements through the G.C.E. Advanced Level Exam. Furthermore, they have studied English up to the Advanced Level. Before their involvement in the research process, all participants were required to provide informed written consent.

Study instruments

The primary instrument utilized for data collection in this quantitative research was the Index of Learning Style (ILS) questionnaire with 44 self-scoring questions, a tool accessible online at <https://learningstyles.webtools.ncsu.edu/>. It is designed to assess the favored learning style among four dichotomous dimensions. Secondary data was gathered from 18 peer-reviewed sources from 1988 to 2023. These sources have focused on learning style preferences assessed mainly by the FSLSM and its Index of learning styles. Core works validating the FSLSM include Felder & Silverman (1988), Felder & Spurlin (2005), and Litzinger et al. (2007). Other works include empirical studies conducted across engineering, such as Hariyanto & Köhler (2017) and Rosati (1997); medicine, including Hernández-Torrano et al. (2017), Liu et al. (2023), and Tariq et al. (2016); business, such as Ghani et al. (2015), Green & Deel (2023), and Naik et al. (2010); and ESL- Shuib & Azizan (2015) and Wijesuriya & Dissanayake (2021)-and finally, some critiques and adaptive applications such as Pashler et al. (2009), Al-Jojo (2012), and Taheri (2003). Data were systematically reviewed for patterns in learning style distributions by gender, region, and field. Full texts were accessed through provided DOIs and open-access links where available.

Procedure

The ILS questionnaire was completed during the English lecture in the last week (14th week) of the semester within 30 minutes. Some incomplete questionnaires were eliminated. Participants learning styles preferences were recognized by categorizing their scores as Strong (9-11), Moderate (5-7), and Balanced (1-3) (Felder & Spurlin, 2005; Litzinger et al., 2007). Subsequently, the gathered data underwent thorough analysis to verify specific trends in the female students' learning styles and to propose suitable pedagogical approaches that could be beneficial within educational settings.

Ethical clearance to conduct the study was sought from the Ethics Review Committee, Sri Lanka Institute of Information Technology, under the Ref number SLIIT/ERC/FH&S/2025/02. It was declared that the study does not require ethical clearance as it does not involve aspects or features – both substantive and procedural – requiring ethics clearance thereof.

Results

The objectives of the current study are to analyze the learning style preferences of female business students in a non-state university and to recommend teaching methods which correspond to the specific preferences of female business students. The scores obtained by female business students under four categories were recorded separately and Table 1 depicts the results of female Business students for each FSLSM characteristic:

Table 1: Learning Styles of Female Business Students in Four Dimensions

Dimension	Strong	Moderate	Balanced
Active	0	21	41
Reflective	0	12	26
Sensing	0	23	36
Intuitive	0	16	25
Visual	13	37	39
Verbal	1	2	8
Sequential	0	14	48
Global	0	6	32

The active–reflective dimension explains how learners process information. Among the female business students, 41% demonstrated balanced tendencies within this dimension, indicating flexibility between active and reflective modes of learning. A moderate preference for active learning was observed among 21% of students, whereas 12% showed a moderate reflective preference. No strong preferences were reported for either active or reflective learning styles. These findings suggest that although some learners may benefit from interactive and collaborative activities, many students can adapt to both reflective and active learning situations.

The sensing–intuitive dimension illustrates how learners perceive and receive information. Within this dimension, 36% of students demonstrated balanced tendencies, while 23% showed a moderate sensing preference and 16% showed a moderate intuitive preference. No strong preferences were identified for either sensing or intuitive learning. The findings indicate that

many learners possess flexibility in processing both practical and conceptual information, although a moderate inclination towards sensing characteristics was comparatively more prominent.

The visual-verbal dimension demonstrated the clearest learner tendency among the participants. A strong visual preference was observed among 13% of students, while 37% demonstrated a moderate visual preference. Additionally, 39% displayed balanced tendencies within this dimension. In contrast, only a small proportion of learners demonstrated verbal preferences, with 1% showing a strong verbal preference and 2% showing a moderate verbal preference. These findings suggest that visual modes of presentation, including diagrams, videos, charts, and demonstrations, may be particularly beneficial in facilitating learning among female business undergraduates.

The sequential-global dimension explains how learners organize and understand information. Within this dimension, 48% of students demonstrated balanced tendencies, while 14% showed a moderate sequential preference and 6% demonstrated a moderate global preference. No strong preferences were reported for either sequential or global learning styles. These findings indicate that although many learners can adapt to both approaches, a moderate tendency towards sequential learning was comparatively more evident. Therefore, teaching approaches may incorporate logically organized and stepwise presentation of content while also allowing opportunities for broader conceptual understanding.

Discussion

Felder-Silverman Learning Style Model (1988) categorizes students across four bands: Active/Reflective (processing), Sensing/Intuitive (perception), Visual/Verbal (input), and Sequential/Global (understanding), upon which the findings of the current study can be closely aligned. Mirroring patterns observed in previous research, the findings of the current study revealed predominantly balanced tendencies across several learning style dimensions among female business undergraduates, with comparatively stronger moderate and strong preferences observed in the visual dimension. Similar patterns of balanced tendencies with limited extreme preferences have been reported in studies involving business students in different educational contexts (Green & Deel, 2023; Naik et al., 2010).

The findings also align with Ghani et al. (2015), where visual learning tendencies were comparatively prominent among business students. Nevertheless, recommendations derived from the current study should be applied cautiously to avoid marginalizing reflective, intuitive, verbal, and global learners within female-oriented learning environments. Therefore, balanced and inclusive instructional approaches may better support diverse learner needs.

Within the active-reflective dimension, balanced tendencies were more prominent than moderate preferences, although a moderate inclination towards active learning was comparatively evident. These findings suggest that female business students may benefit from collaborative and experiential learning activities while still retaining flexibility to engage in reflective learning practices. Therefore, a balanced instructional approach for the active-

reflective dimension may incorporate experiential, activity-driven tasks together with reflective and concept-oriented learning opportunities.

Similarly, the findings demonstrated limited polarization within the sensing–intuitive dimension, although moderate sensing tendencies were comparatively more evident than intuitive tendencies. Therefore, preparing teaching materials such as presentations, models, reports, worksheets, and handouts with practical examples together with opportunities for abstract reasoning may better support the diverse learning tendencies of female business students.

Within the visual–verbal dimension, comparatively stronger moderate and strong visual preferences were observed among the participants, suggesting that visual stimuli may be particularly effective in facilitating learning among female business undergraduates. In English Language Teaching (ELT), the use of videos, mind maps, graphs, pictures, demonstrations, and PowerPoint presentations may therefore support content internalization more effectively than relying solely on lecture-based or auditory approaches.

Furthermore, the presence of strong visual preferences among a proportion of learners indicates the importance of incorporating visually supported instructional methods within business educational contexts. Similar visual learning tendencies have also been reported in studies conducted with mixed-gender business student populations (Ghani et al., 2015; Green & Deel, 2023; Naik et al., 2010).

Lastly, within the sequential–global dimension, balanced tendencies were prominent, although moderate sequential tendencies were comparatively more evident. These findings indicate that female business students may benefit from logically organized and stepwise presentation of content while still maintaining flexibility to engage with broader conceptual understanding. The business curriculum, which frequently emphasizes applied skills such as teamwork and case-based learning, may have contributed to the relatively balanced tendencies observed across dimensions.

A single institutional (non-state university) sample ($n = 100$), heavy female-oriented nature, and self-reported bias may limit generalizability of these results to other business cohorts. Therefore, these patterns may differ in disciplines such as Engineering, where stronger moderate and strong tendencies have frequently been reported across active, sensing, visual, and sequential dimensions due to field-specific demands involving abstract theoretical content, mathematics, and practical application (Felder & Silverman, 1988; Felder & Spurlin, 2005; Litzinger et al., 2007). Therefore, recommendations derived from the current female-oriented study should be generalized cautiously to contexts involving mixed-gender or discipline-specific populations.

Conclusions

The learning style preferences found within this study are relevant for teaching English as a Second Language in business educational settings. Female business undergraduates have clear yet modest preferences across all four dimensions of the Felder-Silverman Learning Style Model. Balanced tendencies were observed across several learning style dimensions, although comparatively stronger visual preferences were evident among the participants.

These findings suggest that content internalization may be facilitated through structured, visually supported, and practical teaching approaches rather than relying solely on abstract and lecture-based methods. At the same time, the prevalence of balanced tendencies across dimensions indicates flexibility among female students in adapting to different modes of learning within each dimension. Consequently, the use of hybrid approaches that feature teamwork, practicality, and problem-solving is advocated. Providing opportunities for independent reflection, theory revision, and creativity could also be advised in this respect. Furthermore, educators and curriculum planners should consciously focus on Reflective, Intuitive, Verbal, and Global aspects so as not to neglect minority learning requirements.

In summary, business education could incorporate recommendations of this study by designing sequentially organized, graphically intensive materials that stress application. Moreover, it is recommended to allow inclusivity for learners with diverse preferences. The areas of potential research may extend the current work on identification of male preferences, which requires an across-group comparison, and learning style identification can be extended across institutions and disciplines, such as Business vs. Engineering.

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The authors declare no conflict of interest.

Data availability statement

The data obtained are available from the author upon reasonable request.

Author Contribution

The author accepted responsibility for the content of this paper, reviewed the findings, and approved the final version for submission.

Conceptualization and study design: K.G. Wijesuriya; methodology development: K.G. Wijesuriya; data collection: K.G. Wijesuriya; statistical analysis: K.G. Wijesuriya; interpretation of results: K.G. Wijesuriya; writing – original draft preparation: K.G. Wijesuriya; writing – reviewing and editing: K.G. Wijesuriya; supervision: K.G. Wijesuriya; funding acquisition: K.G. Wijesuriya.

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