ASSESSMENT OF SELF-DIRECTED LEARNING ABILITIES AMONG FIRST-YEAR UNDERGRADUATE MEDICAL STUDENTS USING THE SDLI TOOL: A CROSS-SECTIONAL STUDY IN GUNTUR, ANDHRA PRADESH, INDIA.

Lakshmi Divya Yadavalli[1], Srujana Dampetla[2], Paleti Nanda Kumar[2], Indla. Devasena[3], Pitta Param Jyothi[4]

[1]Assistant Professor, Department of Physiology, Guntur Medical College, Guntur,Andhra Pradesh, India
[2]Associate Professor, Department of Physiology, Guntur Medical College, Guntur, Andhra Pradesh, India
[3]Associate Professor, Department of Physiology, Sri Venkateswara Medical College, Tirupathi, Andhra Pradesh, India
[4]Professor and Head, Department of Physiology, Government Medical College, Siddipet, Telangana, India

Abstract

Background

Self-Directed Learning (SDL) is a cornerstone of Competency-Based Medical Education (CBME), essential for fostering lifelong learning among future medical professionals. The National Medical Commission (NMC) mandates the integration of SDL in the undergraduate curriculum. However, limited studies in India have assessed SDL abilities using standardized tools.

Objective

To assess the Self-Directed Learning abilities among first-year undergraduate medical students using the validated Self-Directed Learning Instrument (SDLI).

Methods

A cross-sectional study was conducted among first-year MBBS students at Guntur Medical College, Andhra Pradesh. Data collection was conducted in December 2024. A total of 250 students were invited to participate, and 141 students completed the SDLI, yielding a response rate of 56.4%. The SDLI consists of 20 items categorized into four domains: Learning Motivation, Planning and Implementation, Self-Monitoring, and Interpersonal Communication. Each item was rated on a five-point Likert scale. Descriptive statistics were used to analyze the data, and domain-wise mean scores were calculated.

Results

Among the 141 participants, 51.1% were male, and 48.9% were female, with a mean age of 18.5 ± 0.52 years. The highest mean domain score was observed in Learning Motivation (25.56/30), followed by Planning and Implementation (22.63/30), Self-Monitoring (15.67/20), and Interpersonal Communication (11.44/15). The overall mean SDLI score was 75.29 out of a maximum of 95, indicating a moderate to high level of self-directed learning ability among the cohort.

Conclusion

The findings suggest that most first-year medical students possess a favorable level of self-directed learning ability, particularly in motivation and planning. However, relatively lower scores in interpersonal communication indicate a potential area for targeted educational interventions.

Recommendations

The faculty should enhance SDL training by incorporating collaborative learning activities, mentorship programs, and workshops on communication skills. Emphasis on interpersonal communication can complement students' motivation and planning abilities, fostering well-rounded, self-directed learners aligned with CBME goals.

Introduction

Self-Directed Learning (SDL) is a critical competency in medical education, aligning with the goals of producing lifelong learners capable of independently acquiring, integrating, and applying knowledge throughout their careers [1]. The evolving landscape of healthcare requires

medical graduates to be proactive in their learning, adaptable to change, and capable of making informed clinical decisions based on the latest evidence [2,3]. To foster such capabilities, the **Competency-Based Medical Education (CBME)** curriculum introduced by the **National Medical Commission (NMC) of India** has emphasized SDL as a core component since 2019 [4].

According to Knowles's study, SDL refers to a process where individuals take the initiative to identify their learning needs, set learning goals, find appropriate resources, implement learning strategies, and evaluate outcomes, with or without assistance [5]. This shift from teacher-centered to learner-centered education empowers students to take ownership of their academic progress, enhancing both engagement and professional development [6].

Within the CBME framework, SDL activities are conducted through seminars, library assignments, case-based discussions, and museum-based learning. Moreover, SDL carries academic weightage in formative assessments under the new guidelines. However, the effectiveness of SDL largely depends on students' readiness and abilities, which can vary significantly based on prior educational experiences, personal motivation, and institutional support [7].

While several international studies have evaluated SDL readiness in health professional education, research in the Indian context remains limited, particularly using standardized tools like the **Self-Directed Learning Instrument (SDLI)** developed by Shen et al. The SDLI is a validated, structured tool that measures SDL across four key domains: Learning Motivation, Planning and Implementation, Self-Monitoring, and Interpersonal Communication.

This study aims to assess the SDL abilities of first-year undergraduate medical students using the SDLI, thereby providing evidence for educational interventions that can better support and enhance autonomous learning during the formative years of medical training.

Materials and Methods
Study Design and Setting
This was a cross-sectional, descriptive study conducted at **Guntur Medical College**, located in **Guntur, Andhra Pradesh, India**. Guntur Medical College is a premier medical institution offering undergraduate and postgraduate medical education in the region. The study was conducted during **December 2024** and targeted the first-year MBBS students enrolled at the college**.**

Study Participants and Sampling
Eligibility Criteria for participants were as follows.
Participants must be **first-year MBBS students** enrolled in the ongoing academic session. Students who had completed the SDLI survey and provided valid, complete responses were included in the final analysis. Only those who gave **informed consent** electronically to participate in the study were included. Students with incomplete or invalid responses were excluded from the analysis to ensure the reliability of the data. A total of **250 students** were approached to participate, out of which **141 students** completed the SDLI, yielding a response rate of **56.4%**.

A **universal sampling** technique was adopted. Participation was voluntary, and informed consent was obtained electronically from each participant before data collection.

Data Collection Tool
The study utilized the Self-Directed Learning Instrument (SDLI) developed by Shen Study is a validated and reliable tool designed to assess SDL abilities in medical and nursing students. The SDLI consists of 20 items grouped into four domains: Learning Motivation (Items 1–6), Planning and Implementation (Items 7–12), Self-Monitoring (Items 13–16), and Interpersonal Communication (Items 17–20).

Each item was rated on a **5-point Likert scale**, where:
1 = Strongly Disagree,
2 = Disagree,
3 = Neutral,
4 = Agree,
5 = Strongly Agree.

Therefore, the possible scores for each domain and the total SDLI ranged as follows:
Learning Motivation: 6–30
Planning and Implementation: 6–30
Self-Monitoring: 4–20
Interpersonal Communication: 4–20
Total Score: 20–100

Higher total and domain scores reflect stronger self-directed learning abilities.

Although the raw item-wise Likert scores are not displayed individually, the results are presented as mean scores per domain, which were calculated by summing up the Likert responses within each domain and dividing by the number of items.

Data Collection Procedure
The SDLI questionnaire was distributed via **Google Forms** one week after an SDL session was conducted. Students were informed about the purpose of the study, and confidentiality was maintained throughout. Demographic details such as age and gender were also collected.

Data Analysis
Data were exported from Google Forms into Microsoft Excel and analyzed using **SPSS version 22**. Descriptive statistics such as **mean, standard deviation, frequency, and percentage** were used to summarize the demographic

data and SDLI domain scores. The average scores for each domain and the total SDLI score were calculated.

Bias
The study may be subject to selection bias due to voluntary participation, with only 56.4% of students responding. This could limit generalizability, as more motivated or self-directed students may have been more likely to participate, potentially overestimating the overall SDL abilities of the entire cohort.

Ethical Considerations
The study was conducted after obtaining approval from the Institutional Ethics Committee of Guntur Medical College. The ethical clearance number is **GMCIEC029/2024/22-**

08-2024. Informed consent was obtained from all participants, ensuring confidentiality and voluntary participation.

Results
A total of 250 first-year undergraduate medical students were invited to participate in the study. Of these, **141 students** completed the Self-Directed Learning Instrument (SDLI), resulting in a **response rate of 56.4%** (Table 3).

Participant Demographics
The demographic distribution of the respondents is presented in **Table 1**. Among the 141 participants, **72 (51.1%) were male,** and **69 (48.9%) were female**, indicating near-equal gender representation. The **mean age** of participants was **18.5 years (±0.52)**, with a narrow age range of **18–19 years**, consistent with the typical age profile of first-year medical students.

Table 1: Participant Demographics

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	72	51.1%
	Female	69	48.9%
Age	Mean (SD)	18.5 (±0.52)	—
	Range	18–19 years	—

Self-Directed Learning Abilities
Self-directed learning abilities were assessed using the SDLI, which comprises 20 items across four domains: *Learning Motivation*, *Planning and Implementation*, *Self-Monitoring*, and *Interpersonal Communication*. Each item was rated on a 5-point Likert scale, and domain-wise scores were computed accordingly. For each domain, individual responses were recorded using the 5-point Likert scale. The summed domain scores were then computed by adding the Likert ratings for all items in that domain. These were used to generate the mean domain scores, which reflect the collective agreement of students with SDL-related statements. This method preserves the sensitivity of

the Likert scale while simplifying interpretation for analysis and presentation.

As shown in **Table 2**, the highest average score was recorded in the **Learning Motivation** domain (25.56 out of 30), suggesting that students demonstrated strong enthusiasm and intrinsic drive for learning. This was followed by **Planning and Implementation** (22.63/30) and **Self-Monitoring** (15.67/20), reflecting the ability of students to set goals and track their progress effectively. The **Interpersonal Communication** domain received the lowest average score (11.44 out of 15), indicating relatively lower confidence or engagement in peer communication and collaboration.

Table 2: Domain-Wise SDLI Performance

Domain	Number of Items	Maximum Score	Average Score
Learning Motivation	6	30	25.56
Planning and Implementation	6	30	22.63
Self-Monitoring	4	20	15.67
Interpersonal Communication	3	15	11.44
Total SDLI Score	19	95	**75.29**

The total mean SDLI score was 75.29 out of 95, indicating an overall moderate to high level of self-directed learning abilities among the cohort. Key performance metrics and response trends are summarized in Table 3.

Table 3: Response Rate and Overview

Parameter	Value
Total students invited	250
Number of valid responses	141
Response rate (%)	56.4%
Mean total SDLI score	75.29 / 95
Highest scoring domain	Learning Motivation
Lowest scoring domain	Interpersonal Communication

Discussion

This study aimed to assess the Self-Directed Learning (SDL) abilities of first-year undergraduate medical students using the validated Self-Directed Learning Instrument (SDLI). With a response rate of 56.4%, the findings offer valuable insights into the readiness of medical students to engage in self-regulated, independent learning—an essential competency in the context of Competency-Based Medical Education (CBME) [8,9].

The overall mean SDLI score of 75.29 out of a possible 95 indicates a moderate to high level of SDL ability among the participants. This aligns with previous studies that have reported similar readiness among first-year medical students when exposed to structured opportunities for SDL and supported learning environments [10,11]. The findings support the notion that early inculcation of SDL habits is feasible and beneficial within the undergraduate medical curriculum [8,13].

Among the four SDLI domains, **Learning Motivation** recorded the highest average score (25.56/30), reflecting a strong internal drive among students to improve and succeed academically. This is in line with the findings of Shen et al. and Siraja et al., who emphasized the importance of intrinsic motivation in the success of SDL in medical education settings [10,13].

The domain of **Planning and Implementation** followed with a mean score of 22.63/30, suggesting that students are relatively adept at setting goals and devising strategies to achieve them. This finding resonates with prior literature emphasizing that appropriate scaffolding and blended teaching methods can significantly enhance planning skills and goal-directed behavior in learners [9].

However, the **Interpersonal Communication** domain yielded a comparatively lower mean score (11.44/15), pointing to a potential area of concern. While the score still indicates reasonable proficiency, the result highlights the need for interventions aimed at strengthening communication and collaborative skills. These are critical not only for effective SDL but also for clinical competency and team-based healthcare delivery [12,13].

Similarly, the domain of **Self-Monitoring** (mean score: 15.67/20) demonstrated adequate strength, showing that students possess a fair ability to evaluate and regulate their learning progress. Nevertheless, the literature suggests that incorporating structured feedback mechanisms and mentoring programs can significantly bolster this aspect of SDL [11,12].

Overall, the study reinforces the need for an educational environment that not only fosters motivation and independent learning skills but also nurtures interpersonal and reflective capabilities—hallmarks of successful medical professionals in the evolving landscape of healthcare education [8,9,12].

Conclusion

This study highlights that first-year undergraduate medical students at Guntur Medical College exhibit a **moderate to high level of Self-Directed Learning (SDL) ability**, with the strongest performance observed in the domains of **Learning Motivation** and **Planning and Implementation**. The findings affirm that students possess the foundational skills and enthusiasm necessary for self-directed learning, a core component of Competency-Based Medical Education (CBME).

However, the relatively lower scores in the **Interpersonal Communication** domain suggest the need for targeted strategies to strengthen peer collaboration, communication, and reflective dialogue—skills essential not only for effective learning but also for future clinical practice.

These insights can be used by educators to **design more tailored SDL interventions**, mentor students effectively, and foster a learning environment that supports autonomy, critical thinking, and lifelong learning habits. Further research across multiple institutions and cohorts is recommended to validate these findings and assess the longitudinal progression of SDL competencies throughout medical training.

Limitations and Generalizability

While the study provides valuable insights into the self-directed learning abilities of first-year medical students, certain limitations should be considered when interpreting the findings. The study was conducted in a **single medical college** with a relatively modest sample size of 141 participants, which may **limit the generalizability** of the results to other institutions, regions, or educational settings. The cultural and institutional context at Guntur Medical College may have influenced students' exposure and attitudes toward SDL, and these factors may vary across different medical colleges in India or globally.

Furthermore, the study relied on **self-reported data** collected through an online questionnaire, which is subject to **response bias**, including social desirability and acquiescence bias. Additionally, since the study design was cross-sectional, it only offers a snapshot of SDL abilities at one point in time and does not capture changes throughout medical education.

To enhance generalizability, future research should consider **multi-centric studies** involving diverse medical institutions and longitudinal tracking of SDL development over time. Incorporating objective assessments and qualitative methods could also enrich the understanding of factors influencing SDL among medical students.

Recommendations

Based on the study findings, it is recommended that medical educators enhance SDL competencies by integrating structured activities such as goal-setting workshops, reflective journaling, and personalized mentoring programs. Special emphasis should be placed on developing interpersonal communication skills through peer-assisted learning and collaborative projects. Faculty development initiatives should train instructors to facilitate SDL in both online and offline settings. Additionally, institutions should periodically assess SDL abilities to track progress and tailor interventions accordingly. Expanding SDL promotion across all academic years will help cultivate lifelong learners aligned with the goals of Competency-Based Medical Education (CBME).

Acknowledgments

List of abbreviations

SDL: Self-Directed Learning
CBME: Competency-Based Medical Education
NMC: National Medical Commission
SDLI: Self-Directed Learning Instrument

Source of funding

Conflict of interest

The authors declare no conflict of interest.

Author contributions

LDY- Concept and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of the manuscript. **SD- Concept** and design of the study, results interpretation, review of the literature and preparing the first draft of the manuscript, revision of the manuscript.**Review** of literature and preparing the first draft of the manuscript. Statistical analysis and interpretation. **ID-**Concept and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of the manuscript.**PPJ-Concept** and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript.

Data availability

Data Available

Author Biography

Dr. Lakshmi Divya Yadavalli is currently serving as an Assistant Professor in the Department of Physiology at Guntur Medical College, Guntur. She holds both her MBBS and MD in Physiology from the same institution. Dr. Yadavalli has completed training in Good Clinical Practice (GCP) and Good Clinical Laboratory Practice (GCLP), organized by the Clinical Development Services Agency (CDSA) and Translational Health Science and Technology Institute (THSTI). She has previously served at Dr. PSIMS & RF, China Avutapalli, and SV Medical College, Tirupati. Dr. Yadavalli has authored two research publications and has mentored Indian Council of Medical Research – Short Term Studentship (ICMR-STS) projects that have received approval from ICMR.**ORCID ID:0009-0009-1659-7159**

Dr. Srujana Dampetla is working as an Associate Professor at Guntur Medical College, Guntur, Andhra Pradesh, India. She completed her MBBS from Siddhartha Medical College, Vijayawada, and did her MD in the Upgraded Department of Physiology from Osmania Medical College, Hyderabad. With over 11 years of teaching experience, she has successfully guided her undergraduate students through their funded ICMR projects. She published 6 research papers in reputed Journals focusing on physiology and public health.**ORCID ID:0009-0004-9259-229X**

Dr. Paleti Nanda Kumar is currently serving as an Associate Professor in the Department of Physiology at Guntur Medical College, Guntur. He holds both his MBBS and MD in Physiology from the same institution. Dr. Paleti Nanda Kumar, in his 11 years and 8 months of teaching experience, has authored nine research publications in reputed journals focusing on Physiology, public health, and teaching methods. **ORCID ID:0009-0007-6125-7095**

Dr. Indla Devasena is currently working as an Associate Professor at SV Medical College, Tirupati, Andhra Pradesh, India. She completed her MBBS from Siddhartha Medical College, Vijayawada, and her MD in Physiology from Kurnool Medical College, Kurnool. With over 16 years of

experience, she has successfully guided both undergraduate and postgraduate students. She has published over 10 scientific research papers in various journals in the field of Physiology.**ORCID ID:0009-0008-8725-210X**

Dr. Pitta Param Jyothi is a Professor and Head of the Department of Physiology at Government Medical College, Siddipet, Telangana, India. She completed her MBBS from Siddhartha Medical College, Vijayawada, and her MD in Physiology from Kakatiya Medical College, Warangal. With 18 years of teaching experience, Dr. Param Jyothi has significantly contributed to medical education. She was awarded the **Dr. C. S. Ramayya Memorial Medal (2006)** for being the Best Outgoing Student in MD Physiology by NTRUHS, Vijayawada. She also received a **Certificate of Excellence** for her outstanding contribution as a reviewer for the *International Journal of Biochemistry Research and Review*. Dr. Param Jyothi has authored **28 publications** in peer-reviewed journals.**ORCID ID:0009-0009-2362-3044**

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