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Original Research Article

The effectiveness of implementation of grow's SSDL model on self-directedness of first phase MBBS students

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Abstract

Background: Given the exceptionally rapid evolution of medical knowledge, medical education systems globally have embraced self-directed learning (SDL). The GMER -2019 guidelines by MCI in India expects the Indian medical graduate to fulfill the role of lifelong learner. For this CBME Curriculum has dedicated specific hours of teaching with Self directed learning sessions in each subject without any uniform subject competencies, T-L methods and evaluation of selfdirectedness that the students achieved. As the students admitting for MBBS course in India are from various socioeconomic, cultural and educational background makes varied levels of their preparedness for SDL.
Aim: To Implement and analyze effectiveness of Grow's Staged SDL Model for first phase MBBS students' selfdirectedness. .
Materials and Methods: The study was conducted in the department of Anatomy at JNMC, Sawangi, India.209 first phase MBBS students were the volunteered participants divided into control and experimental groups. The SDLRS scores were measured before and after the implementation of Grow's staged SDL model. The model was implemented during allotted teaching hours for SDL sessions in the curriculum for the subject of Anatomy. Statistical analysis was conducted to study the effectiveness of the Grow's SSDL model on selfdirectedness of participants. Results: Overall statistically significant enhancement in SDLRS scores of the experimental group, reflecting the effectiveness of the Grow's SSDL model on selfdirectedness of first phase MBBS students.
Conclusions: These outcomes highlight the value of integrating Grow's SSDL Model into regular teaching during GMER dedicated SDL hours in the subject of anatomy to impart lifelong learning skills in medical undergraduates.

Keywords: First phase MBBS, Self-Directed Learning, Grow's Model

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1. Introduction

This study on implementation of Grow's staged self-directed learning (SSDL) model in teaching anatomy to first phase MBBS students emphasizes how the self-directed learning (SDL) approach can be planned. implemented and evaluated within a graduate medical education setting. For medical educators, the work illustrates a practical way to cultivate learner ownership and critical thinking through structured teaching learning activities. For program leaders, it demonstrates how SDL supports competency based curricula, aligns with regulatory expectations and strengthen the culture of lifelong learning within medical undergraduate training programs. For researchers, the study provides new data on learner behaviour and performance outcomes and identifies areas for future investigations.

SDL has long been recognized as a foundational attribute of adult learning. Knowles described SDL as a deliberate process in which learners take initiative in identifying their learning needs, setting goals, selecting suitable strategies and resources, and evaluating their own progress. He emphasized that individuals who actively engage in this process demonstrate deeper and more meaningful learning compared to those who depend solely on external instruction.[1] With the increasing complexity of medical knowledge and the expectation of lifelong learning skills from medical graduates, SDL has become particularly relevant in medical education.

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The Hersey and Blanchard (1988),Situational Leadership model inspired Gerald Grow to develop Grow's Staged Self-Directed Learning(SSDL) Model. This model put forward that learner's progress through various stages of enhancing self-direction and the teachers will play a role to either help or hinder that progress.As per this model Good teaching is one that matches with the learner's stage of self-direction and progress the learner to move toward greater self-direction. According to Grow (1991) SDL can be taught as well as can be learned. Grow provides a staged Self Directed Learning (SSDL) model outlining how teachers can help learners with the transition from dependent learners into independent self-directed learners. [2]For teaching students at each stage,certain specified methods are suggested so as to have match between teaching style and learning style that will facillitate delf directed learning too!This will also circumvent the mismatches that will occur between a student needing self-direction and a nondirective teacher.[2]

Medical schools admit students from diverse educational, socioeconomic, and cultural backgrounds, resulting in considerable variation in their readiness for SDL. Faculty members often face challenges in introducing SDL to such heterogeneous cohorts, especially when both teachers and students are more familiar with passive, teacher-centered instructional methods. Encouraging learners to transition from dependency to autonomy requires structured guidance, supportive learning environments, and pedagogical approaches that progressively build self-direction.[2]

Existing literature includes several studies assessing the Self-Directed Learning Readiness Scale (SDLRS) among undergraduate medical students. However, most of these studies focus only on measuring SDL readiness without embedding students in a systematic SDL process.[3,4,5] Many investigations lack a clearly defined intervention, do not include comparison between experimental and control groups, or fail to evaluate pre- and post-intervention changes.[6,7,8,9] These methodological gaps limit the evidence available on how structured SDL modeles influence readiness levels of medical undergraduates.

2. Rationale of the Study

Given these gaps, there is a need for research that not only measures SDL readiness but also examines how the instructional Grow's SSDL model intervention impacts students' readiness for SDL. Implementing SDL in a controlled and comparative framework can provide more robust evidence on its educational value and help guide faculty in integrating SDL into undergraduate curricula.

The present study was undertaken to address these gaps aimed to determine effectiveness of implementation of Grow's SSDL model in anatomy on selfdirectedness of first phase MBBS students.

3. Materials and Methods

3.1. Type of study

It is an prospective Intervention study.

3.2. Study settings

First phase MBBS batch of 2022-23 in the department of anatomy,at JN Medical college,Sawangi,Wardha.
IEC Approval received from institutional ethics committee before starting the study.

3.3. Sampling procedure

With a finite population, like ours 1st MBBS class of 250 students & practical constraints are decisive of sample size to be included in experimental & control group.So we choose the sample size formula for a 2:1 or more distribution to maximize the the exposure to the beneficial effects of intervention.

As we received voluntary consent from 147 students to participate in the study and 62 to be included in the control group. Participants were allocated into experimental and control groups based on consent availability. Random allocation was not performed. To keep the sample size in the statistical power we calculated the hypothetical power analysis with Experimental gr n=147 & Control gr n=62 and reached to the conclusion that with an experimental group of 147, a control group of 62, a medium effect size of 0.5, and a standard significance level of 0.05, our study has an estimated statistical power of 0.91. Since this value is greater than the desired power of 0.80, our sample sizes are sufficient to detect the specified effect.

3.4. Materials used:1. 29 Item abridged fisher's SDLRS scale[10]

Fisher's SDLRS is a reliable scale for measuring SDL readiness. A reliable abridged 29-item version of the scale was developed using factor analysis by Akkilagunta et al, they successfully reduced the scale to 29 items across three domains using Principal Component Analysis (PCA). This condensed version maintains the scale's conceptual framework, with its three factors explaining 35.8% of the variance—a figure comparable to the 36.4% found in the original Fisher et al. study. This reduction in items effectively shortens the scale without compromising its core structure or validity.We used this 29 item abridged scale to measure the SDL readiness of the first phase MBBS students at entry level and after completion of first phase of MBBS.[10]

Written informed voluntary consent, demographic data & 29-Item abridged Fisher's SDLRS was collected from experimental and control group students before implementation of Grow's SSDL model after the experimental group and control group completes the first phase MBBS and entered the Second phase of MBBS SDLRS scores were calculated once again at exit point of

intervention.All the responses were exported to Microsoft excel files and the descriptive data was converted to ordinal data for ease of statistical analysis. Comparative analysis will be done between the data of SDLRS Scores collected at entry level and at exit level for control group and experimental group to evaluate the effectiveness of staged SDL Model for imparting self-directedness in learning as well as lifelong learning skills in them. **Figure 1**

Grow's Staged SDL (SSDL) model:[2] As described by the Grows SSDL model progression from dependency to self-direction is a part of adult education.We implemented this model in teaching anatomy to first phase MBBS students ,So that the learner is carried from the initial dependency to independency/self-directedness in learning anatomy.Grow's SSDL model introduces the four stages of the SSDL model.

Details of Model Implementation:So to keep up with this, to teach anatomy by selecting specific core competencies from anatomy curriculum of CBME in such a way that it will follow the guidelines given for each stage in Grow's SSDL Model.

Training facilitators for conducting SDL is a crucial step in effectively implementing this pedagogical approach. The goal of such training is to equip facilitators with the necessary skills and understanding to guide learners in taking ownership of their learning journey.This was followed by a group discussion among the facilitators about selection of competencies and various TL methods relevant with the stage of Grow's SSDL model for implementation .Control group will get similar topic and time for SDL to study it on their own without any intervention.

3.5. Observations and results

Statistical Software Package Used is IBM SPSS Statistics Version 22 & Microsoft Excel 2019 for data tabulation and graphical representation. The comparison of self-directed learning readiness components between the control group (n = 62) and the experimental group (n = 147) shows notable differences across both pre intervention and post intervention measures.Since the sample size in both experimental and control groups was more than 30, the sampling distribution of the mean approximates normal distribution as per Central Limit Theorem. Therefore, Z-test was applied to compare the mean scores between groups.

Table 1: SDLRS pre and post intervention across three domains self-control, self-management and desire for learning

		N	Mean	Std. Deviation	Z-test	P-value
Self-Control Pre	Control	62	58.1452	11.27430	-1.14211	0.253409
	Experimental	147	58.6599	7.11019		
Self-management Pre	Control	62	31.1290	7.08840	-1.06147	0.288475
	Experimental	147	32.9252	7.75400		
Desire for Learning Pre	Control	62	20.2903	5.05831	-0.82573	0.408955
	Experimental	147	20.5102	3.81843		
SDLRS Total Score Pre	Control	62	109.5645	20.26110	-0.39451	0.693201
	Experimental	147	112.0952	13.19367		
Self-Control Post	Control	62	63.2742	8.59693	-0.69103	0.489544
	Experimental	147	63.8776	5.23018		
Self-management Post	Control	62	35.4677	7.07737	-4.60281	< 0.01
	Experimental	147	40.3946	5.51779		
Desire for Learning Post	Control	62	27.1774	5.38828	-5.75985	< 0.01
	Experimental	147	31.6463	4.29208		
SDLRS Total Score Post	Control	62	125.9194	18.10108	-4.06668	< 0.01
	Experimental	147	135.9184	7.75437		

Table 1 & Graph 1. For self-control, self-management and desire for learning in the pre intervention SDLRS scores, the control group and experimental groups shows notable difference but it is not statistically significant. The SDLRS total score pre intervention was 109.5645 ± 20.26110 for the control group and 112.0952 ± 13.19367 for the experimental group, with a Z-value of –0.39451 and p = 0.693201, confirming similarity in baseline readiness.

In contrast, post intervention scores demonstrate significant improvement in the experimental group across most domains. For self-control post intervention SDLRS Scores, the control group had a mean of 63.2742 ± 8.59693, while the experimental group scored 63.8776 ± 5.23018, resulting in a Z-value of –0.69103 and a p-value of 0.489544, suggesting no significant difference. However, in self-Management post intervention SDLRS scores, the control group mean was 35.4677 ± 7.07737, compared to 40.3946 ± 5.51779 in the experimental group, with a Z-value of –4.60281 and a p-value < 0.01, indicating a highly significant improvement. Similarly, desire for learning post intervention SDLRS scores

showed a marked increase, with the control group scoring 27.1774 ± 5.38828 and the experimental group scoring 31.6463 ± 4.29208, yielding a Z-value of –5.75985 and $p < 0.01$, confirming significant enhancement in the experimental group. The SDLRS total score post intervention also showed substantial improvement, with the control group mean at 125.9194 ± 18.10108 and the experimental group at 135.9184 ± 7.75437, giving a Z-value of –4.06668 and a p-value < 0.01, indicating a strong significant difference favoring the experimental group after the intervention.

Table 2: Learning gain analysis across self-control, self-management and desire for learning domains of SDLRS scores.

Variable	Group	Entrypoint SDLRS Mean	Exit point Mean	Difference	Absolute Gain	Relative Gain (%)	Normalized Gain (%)
Self-Control	Control	58.1452	63.2742	5.129	5.129	8.821	12.2543
Self-Control	Experimental	58.6599	63.8776	5.2177	5.2177	8.8948	12.6214
Self-Management	Control	31.129	35.4677	4.3387	4.3387	13.9378	6.2997
Self-Management	Experimental	32.9252	40.3946	7.4694	7.4694	22.686	11.1359
Desire for Learning	Control	20.2903	27.1774	6.8871	6.8871	33.9428	8.6402
Desire for Learning	Experimental	20.5102	31.6463	11.1361	11.1361	54.2954	14.0095
SDLRS Total Score	Control	109.5645	125.9194	16.3549	16.3549	14.9272	170.9959
SDLRS Total Score	Experimental	112.0952	135.9184	23.8232	23.8232	21.2526	196.9641

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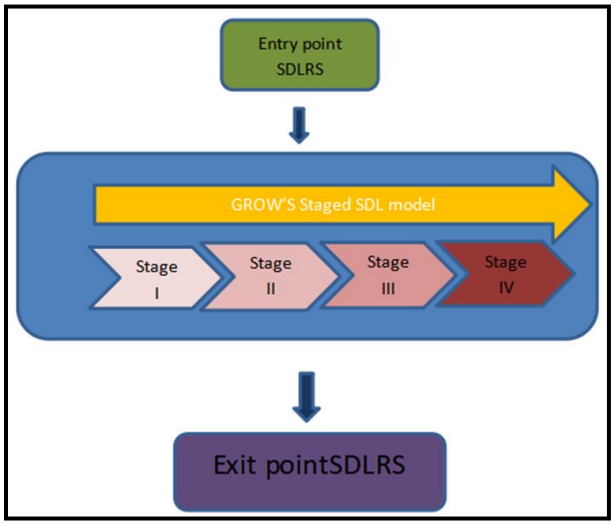
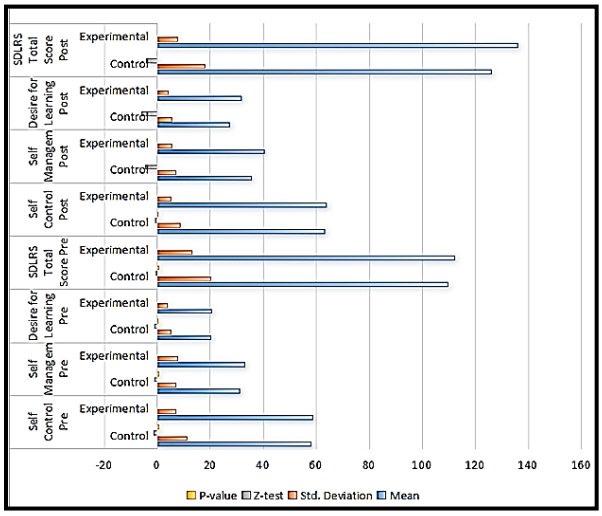
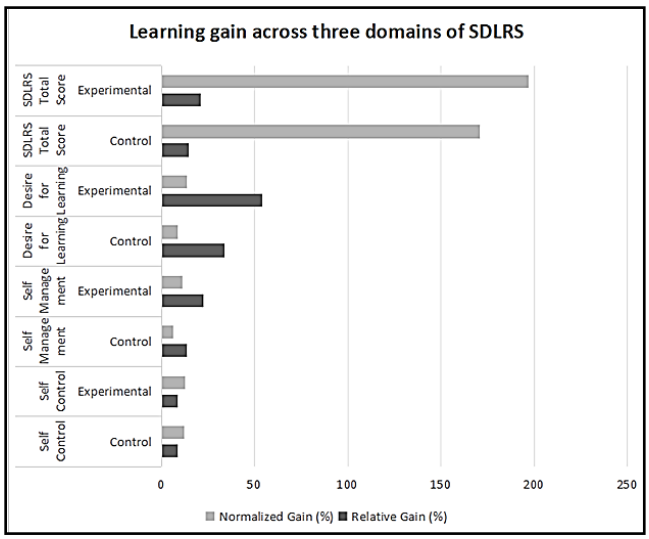


Figure 1: Methodology flow diagram



Graph 1: Graphical representation of satistical analysis of SDLRS pre and post intervention across three domains Self-control, Self managemnt and desire for learning



Graph 2: Graphical representation of Learning gain analysis across self-control, self-management and desire for learning domains of SDLRS scores

Table 2 and Graph 2 demonstrates the learning gain analysis comparing the control and experimental groups shows consistent improvement across self-management and desire for learning domains of self-directed learning readiness. For self-control domain pre intervention and post intervention scores among control and experimental group indicating almost identical gains in both groups.

The SDLRS total Score, the Control group increased from 109.5645 to 125.9194, producing an absolute gain of 16.3549, a relative gain of 14.9272%, and a normalized gain of 170.9959%. The Experimental group showed an even larger improvement, with scores increasing from 112.0952 to 135.9184, corresponding to an absolute gain of 23.8232, a relative gain of 21.2526%, and a normalized gain of 196.9641%, indicating a very strong intervention effect.

Overall, both groups improved, but the experimental group consistently demonstrated higher gains in all SDL components, with notably larger improvements in self-management, desire for learning, and total SDLRS Score.

4. Discussion

Although the term is widely used by educators,faculty often differ in their understanding of what self-directed learning actually means, how it should be carried out, and how students can be guided to become self-directed learners.[11] internationally, learners find it challenging to cope with the rapid expansion of knowledge and fast-paced technological advancement.[12-14] The inability to anticipate the shifts brought about by this growing knowledge base often leaves students ill-prepared for what lies ahead.[15-17] As a result, current educational practices do not adequately empower learners to manage their future academic demands.[18,19] Hence, SDL is increasingly viewed as essential for equipping students to address upcoming learning challenges.

Many studies like Hamza et al ,Sanobar et al. Kar et al showed differences in SDLRS related to demographic information This indicates that readiness to undergo SDL varies from student to student depending on their sociocultural, educational backgrounds. Therefore, understanding their readiness is necessary to before implementing SDL for them.[20-22]Assessing SDL readiness before implementation of SDL helps instructor identify students' strength and weaknesses in SDL as well as recognizing learners who struggle with independence allows targeted interventions and builds skills necessary for effective lifelong learning.[6,23]

It is necessary for teachers to cultivate positive interdependence, face-to-face interactive and cooperative behaviour, self-responsibility, and group dynamics, which are essential for effective SDL.Like many other skills developing self-directed learning also takes time and expects the teachers to be a supporter or guide whenever needed.[24] Grow's Staged Self-Directed Learning (SSDL) framework, which draws heavily from Hersey and Blanchard's (1988) situational leadership theory, is among the most widely recognized instructional SDL models in which the students and the teachers roles are reciprocally integrated.[25.]

Number of studies like Halftom Kidane et al,Molly hill et al, Jackrin Kewcha Roen,Patra et al, PR Shankar et al ,Chuhuni et al implemented SDL activity in Medical undergraduates but did not measured SDLRS before and After implementation of SDL activity[7-9,25-27] Kalyani Premkumar et al in a longitudinal mixed method study concluded that existing teaching strategies may need to be reviewed and redesigned to better foster SDL.[4]

Our study was unique in which we not only implemented the Grow's SSDL model in anatomy but also measured pre and post intervention SDLRS scores among

experimental and control groups to evaluate the effect of its implementation on selfdirectedness by first phase MBBS students.

With the implementation of Grow's SSDL model in anatomy teaching the experimental group demonstrated. Statistically significant improvement in SDLRS scores of experimental group across all three domains of the SDLRS. A higher absolute gain of 23.802, Relative Gain of 21.23%, and Normalized Gain of 196.45%. as compared to control group. This indicates that the intervention significantly enhanced self-directedness among the experimental group compared to the control group.

5. Conclusion

The findings of this study show that applying the instructional Grow's SSDL model in teaching Anatomy produced a clear improvement in students' readiness for self-directed learning. When learners were given systematic support in setting learning goals, selecting resources, working independently, and reviewing their progress, they developed stronger skills and confidence in managing their own learning. The role of the teacher in moving the students from dependency to independency is also emphasized.

6. Limitation

This is a single institutional study so findings cannot be generalized to different educational settings.

7. Source of Funding

None.

8. Conflict of Interest

None.

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