

Self-directed learning, intrinsic motivation and student performance

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This study investigates the effect of self-directed learning and intrinsic motivation on student performance. For the assessment of self-directed learning, the revised self-directed learning readiness scale for nursing education (SDLRS_NE) questionnaire was administered and intrinsic motivation was assessed using the Motivated Strategies for Learning Questionnaire (MSLQ). The questionnaires were administered to 485 students in all academic years of the medical (MBBS) programme at the University of the West Indies. The study showed a significant positive effect of intrinsic motivation and self-directed learning on student performance.

Key words: Self-directed learning, intrinsic motivation, student performance

Introduction

The mission statement of the Faculty of Medical Sciences at the University of the West Indies (UWI) is to train health professionals to meet the needs and improve the care of those whom they serve. Graduates are expected to strive for professional excellence while contributing to the social, economic and cultural development of the Caribbean, and to embrace an attitude of lifelong learning, ethical conduct and excellence in service and research. A key question is whether this vision of creating lifelong learners is actually met by the programme. It is hoped that students through problem-based learning and clinical reasoning develop a more self-regulated approach to learning. Review of the literature indicates that a self-directed approach to learning and intrinsic motivation are important factors influencing the desired outcome of the programme of developing lifelong learners. The aim of the study is to investigate the effect of self-directed learning and intrinsic motivation on student performance.

The majority of students entering the programme come from a high school background, which has traditionally not supported a self-directed learning style and students at this level are dependent on extrinsic factors for their performance outcomes. The undergraduate medical programme is a five-year course of study offering a Bachelor of Medicine, Bachelor of Surgery (MBBS) with admission of students mainly from a high school programme with a minority of students

entering from an undergraduate bachelor programme. The desired outcome from the undergraduate programme is a doctor who is expected to be a sophisticated learner making the transition from the external regulation to a more self-regulated learning style of the “expert learner” (Ertmer and Newby, 1996). For the students to navigate through the programme, the development of good metacognitive skills are important so that they could maximize the limited study time available and improve the quality of their learning (Smits, Verbeek, Nauta, Ten Cate, Metz & Van Dijk, 2004). In order to achieve this, the students must develop good self-directed learning skills and be intrinsically motivated. The challenge therefore is for the programme to foster the development of good learning skills in order for students to meet the necessary competences and to sustain lifelong learning.

In modern constructivism theory the learner is in control of the learning activity and as such, must master the art of learning. Learning style may be considered as the way students begin to concentrate on, process, internalize and retain new and difficult academic information (Dunn, Griggs, Olson & Beasley, 1995). The learning style of the student can be viewed as a balance between the cognitive style and the personality. It infers that the student’s learning style has a habitual and distinct mode of acquiring knowledge. Understanding students’ learning styles along with learning theory have been used as the basis for designing modern curricula at many universities, with the hope that this will improve student outcomes in relation to examination performance. This has not been fully supported by the current available literature. Although educational strategies are based on learning theory and learning styles, little is known about the effect of medical curricula on students’ learning styles.

Vermunt (1996) proposed a modern constructivist approach to learning styles. The Inventory of Learning Styles developed by Vermunt attempts to assess the students’ learning style. It covers four domains: cognitive processing strategies, regulation of learning, learning orientation, and conceptions of learning. The regulation strategies in the learning activity may involve self-regulation in which the learner regulates his own learning process with a certain amount of independence. There may also be external regulation where there is dependence on teacher, course material, objectives that influence both the learning process and outcomes. Lack of regulation indicates that the learner has difficulty monitoring/ knowing what is necessary to learn or his ability to assimilate the knowledge. For learning to be effective, the learner must have good self-regulation with some degree of external guidance, such as a stimulating curriculum. Self-regulation in students learning style involves goal setting, self-monitoring and self-efficacy as important contributors to their academic performance. Students initially develop self-regulation through social modeling then later develop individual strategies for which self-motivation plays a big role (Zimmerman, 1996). The learning behavior must be goal directed and the students must actively manage their learning process, thus enabling them to set, direct and monitor their learning goals. Self-regulated learning is a mediating variable between personal, situational and achievement factors.

Self-directed learning is the initial process of self-regulated learning involving the active management of students' learning (Loyens, Madga and Rikers, 2008). In reviewing the literature there is substantial evidence that problem-based learning (PBL) fosters the development of self-directed learning (Walker and Leary, 2009). However it has been difficult to tangibly measure this difference over entire curricula. Harvey, Rothman and Frecker (2003) studied self-directed learning (SDL) in medical students. The study examined the self-directed styles of 250 students (approximately 60 per academic year) of a four-year programme using the following SDL instruments: Gughielmino's 58-item SDL readiness scale and Oddi's 24-item continuous learning inventory. The researchers concluded that there was no significant difference of SDL being positively enhanced by the curriculum.

Pintrich (1999) concluded that self-regulated learning could be facilitated by the adoption of intrinsic motivational factors and hindered by extrinsic motivational factors. Positive self-efficacy and task value beliefs promote self-regulated behavior. In the self-regulation process the student goes through four phases:

- Planning, goal setting and activation of perceptions and knowledge of the task
- Monitoring process in which metacognitive awareness between self and task
- Control and regulation of the previous phases
- Regulation and reflection of the learning outcome.

One can then look at the different facets of these phases – Cognition, motivation / affect, behavior and context. For the motivation/affect, in phase 1 the learner may be goal oriented and adopt a good efficacy of judgments with clear perceptions of the task with values and interest activation. In phase 2, learners must be aware and monitor their motivation and levels of interest in relation to the task. For phase 3, selection and adaptation of strategies for managing, motivation and affect for the task. Finally in phase 4, the learner reflects on the affective reactions (Pintrich, 2004). Motivational factors are therefore important to students' learning and performance.

Student performance is dependent on many factors: Student cognition, learning strategies, the assessment tool, psychosocial factors, the learning environment, self-directed learning and motivation. These factors are by no means the only factors impacting on performance. But to what extent and how does self-directed learning and intrinsic motivation affect academic performance? Zimmerman (1990) showed that self-regulated learners are successful academically and understand, value, and engage in learning in ways that are fundamentally different from externally regulated students. The self-regulation process substantially empowers students' academic motivation and in turn academic success (Zimmerman, 1996). A meta-analysis conducted by Robbins, Lauver, Le, Davis, & Langley (2004) showed that there was a strong correlation between self-efficacy and achievement motivation and Grade Point Average in American college

students. From a theoretical perspective it is important to understand how self-directed learning and intrinsic motivation are interrelated and how together and individually they impact on student performance. This study will investigate the effect of self-directed learning and intrinsic motivation on student performance in the context of the medical school curriculum at The UWI. It is hoped that student performing well may be more self-directed and intrinsically motivated, thus meeting the goal of The UWI in producing life-long learners.

Research questions

1. *What is the relationship between self-directed learning, intrinsic motivation and student performance over a medical curriculum?*
2. *Is there a difference in self-directed learning and intrinsic motivation over the medical curriculum?*

Methods

Design

This research is a deductive, descriptive cross-sectional study investigating the relationship between self-directed learning, intrinsic motivation and student performance.

Setting

The study was conducted at the Medical school, Faculty of Medical Sciences (FMS), The University of the West Indies over the period September 2012 to December 2012. The undergraduate medical programme is a five-year course of study offering a Bachelor of Medicine, Bachelor of Surgery (MBBS). Admission of students is mainly from a high school programme with a minority of students entering from an undergraduate bachelor programme after completion or transfer after the first year of their studies. The spiral curriculum was adopted with a hybrid of a problem-based learning (PBL) approach and a traditional system-based approach for the first three pre-clinical years. The curriculum is taught system-based in the preclinical year by lectures /laboratory /seminar sessions and PBL tutorials. Students then enter the clinical years where again the focus is small group teaching and enhancing clinical reasoning.

Participants

All students enrolled in the Medical school at the Cavehill and St. Augustine campuses. Years one to five with an estimated study population of 1400 students. All students were invited to participate on a voluntary basis. The students were invited to complete a hard copy of two questionnaires.

Instrument

For the assessment of self-directed learning, the revised self-directed learning readiness scale for nursing education (SDLRS_NE) questionnaire was administered. The choice of the SDLRS_NE was made based on the literature by Fisher and King (2010) who showed that the revised 40-item self-directed learning readiness scale for nursing education (SDLRS_NE) had good validity. The instrument was a self-report 40-item questionnaire using a 5-point Likert scale (Fisher and King, 2010). It is the widely used instrument for assessing self-directed learning readiness. The SDLRSNE has three sub-scales:

- Self-management subscale (13 items)
- Desire for learning subscale (12 items)
- Self-control subscale (15 items)

The overall scores range from 40 to 200, with higher scores reflecting a higher degree of SDLR. The values of internal consistency established using Cronbach's coefficient alpha were 0.924 in the total item pool (40 items), 0.857 in the self-management subscale, 0.847 in the desire for learning subscale, and 0.830 in the self-control subscale among 201 undergraduate nursing students (Fisher, Tague and King, 2001).

Intrinsic motivation was assessed using the Motivated Strategies for Learning Questionnaire (MSLQ) which was also a self-report instrument widely used in research (Duncan and Mc Keachie, 2005). The MSLQ is an 81-item self-report questionnaire, using 7-point Likert scale. There are two broad categories: student motivation (31 items) and learning strategies (50 items). There are six motivation subscales and nine learning strategies scales. The motivation scales measure:

- Value – intrinsic and extrinsic goal orientation and task value
- Expectancy – control beliefs about learning and self-efficacy
- Affect – test anxiety.

The learning strategies cover cognitive, metacognitive and resource management strategies.

Demographic details were collected on the following:

- Student ID number
- Age
- Gender
- Academic year in the programme
- Campus.

Student performance was the student's academic performance from their recently completed module (preclinical students Years 1 – 3) or clerkship (clinical years 4 and 5).

Procedure

Students were actively recruited, by attending sessions when the entire class was expected to congregate such as lectures, PBL and clinical teachings. Written consent was obtained and a hard copy of instruments, SDLRSNE and MSLQ, were administered to participating students. Any questions about completing the questionnaire were addressed and academic grades were self-reported by the students. Ethical approval was attained from the UWI ethics committee (Cavehill and St. Augustine campuses) before the start of the study.

Assumptions

- Participants answered the questionnaires honestly, especially since the grades are self-reported
- The assessments for student academic performance are in line with the curriculum, where the assessments are measuring the desired objectives.

Statistical analysis

The data were analyzed using SPSS 20. For this study the total motivation and learning strategy scores were analysed as well as the three subscale-scores for intrinsic and extrinsic goal orientation and metacognitive self-regulation for the MSLQ. For the SDLRSNE the total and all three sub-scales were analysed. Descriptive statistics were calculated to show the percentages of gender, academic year and grade. The internal consistency reliability for all total scales was calculated and the Cronbach α reported.

The data were analysed using ANOVA

- With grade as the independent variable and dependent variables motivation and SDLR and selected subscales
- Post-hoc test (Bonferroni) was used to further investigate the mean differences (i.e., exactly where the differences are, given the significance in the ANOVA).

The analysis was then repeated using academic year as the independent variable.

Results

Demographic data

A total of 485 students participated in the study. This represents a recruitment rate of 34% of the student population. The male to female ratio was 1:2 with 160 male participants (33%), 316 female participants (65%) and 9 participants did not indicate gender (2%). This male to female ratio is similar to that of the student population, which is 1:1.8.

Table 1: Participants by Academic Year

Academic Year	No. of participants	%
1	97	20
2	88	18.1
3	149	30.7
4	60	12.4
5	91	18.8
TOTAL	485	100

Table 2: Participants by grade

Grade	No. of participants	%
Distinction (A)	64	13.2
Honours I (B+)	57	11.8
Honours II (B)	75	15.5
Pass (C)	140	28.9
Fail (F)	20	4.1
Missing	129	26.6
TOTAL	485	100

Table 3: Means for MSLQ / SDLRS and Subscales by Academic Year

Academic year		MSLQ					SDLRS_NE			
		Total	Intrinsic	Extrinsic	LS	SR	Total	SM	DL	SC
1	Mean	161.91	18.57	22.59	226.51	52.98	153.70	46.74	43.32	57.17
	N	97	97	97	97	97	97	96	96	96
	SD	22.00	4.04	4.56	34.17	9.75	24.12	7.72	5.98	6.97
2	Mean	160.88	18.69	21.33	233.33	52.99	160.25	50.65	46.09	58.86
	N	88	88	88	88	88	88	88	88	88
	SD	22.96	4.36	4.76	36.70	9.45	34.93	12.15	10.72	8.68
3	Mean	162.38	19.21	21.14	228.62	51.95	152.30	49.81	44.66	58.14
	N	149	149	149	149	149	149	149	149	149
	SD	19.01	3.94	4.16	37.22	10.75	42.39	10.06	5.78	8.24
4	Mean	156.93	19.58	19.77	228.33	51.78	133.68	48.06	44.00	54.87
	N	60	60	60	60	60	60	52	51	52
	SD	18.90	3.65	3.77	32.66	8.92	60.71	8.82	10.91	12.40
5	Mean	155.24	19.64	19.01	227.24	50.87	126.14	45.92	43.01	55.43
	N	91	91	91	91	91	91	91	91	91
	SD	20.73	8.08	5.18	34.22	9.80	64.77	10.11	11.29	12.85
Total	Mean	160.00	19.11	20.89	228.76	52.12	146.81	48.46	44.30	57.24
	N	485	485	485	485	485	485	451	449	450
	SD	20.80	5.03	4.65	35.36	9.92	47.61	10.05	8.68	9.6

The mean score for the MSLQ scale was 160 and that for the SDRLS was 146.8. The reliability for the scales was calculated, with a Cronbach α of 0.91 for the MSLQ and 0.82 for the SDRLS. For the SDRLS subscales: self-management, desire for learning and self-control the values were 0.66, 0.42 and 0.77 respectively. For the learning strategies, external and intrinsic goal orientation, the Cronbach α was 0.89, 0.57 and 0.5 respectively.

Relationship between motivation and student performance

Using the oneway ANOVA with grade as the categorical independent variable and motivation as the dependent variable. There was no significant difference between total motivation scores and grade attained by participants. There was however, a significant association noted in four subscales: intrinsic goal orientation (.003), learning strategies (.000) and metacognitive self-regulation (.000).

Table 4: ANOVA -Motivation and Subscales by Grade

		df	Mean Square	F	Sig.
Motivation	Between Groups	4	884.358	2.042	.088
	Within Groups	351	433.160		
	Total	355			
Intrinsic goal orientation	Between Groups	4	115.149	4.105	.003
	Within Groups	351	28.048		
	Total	355			
Extrinsic goal orientation	Between Groups	4	45.625	2.367	.053
	Within Groups	351	19.278		
	Total	355			
Learning Strategies	Between Groups	4	9045.658	7.574	.000
	Within Groups	351	1194.257		
	Total	355			
Metacognitive Self-regulation	Between Groups	4	696.182	7.516	.000
	Within Groups	351	92.622		
	Total	355			

Examining this in more detail using the Bonferroni post-hoc test, there was a significant difference in intrinsic goal orientation scores for students attaining a failing grade (F) and students attaining a grade A or B+, indicating that intrinsic motivation was important for attaining higher grades A/B+ compared to a failing grade. There was also a significant difference in learning strategies and the subscale metacognitive self-regulation scores for students attaining a failing grade (F) and students attaining all passing grades (A to C), indicating that these factors important for students to obtain a passing grade.

*Relationship between self-directed learning and student performance***Table 5:** ANOVA -SDLRS and Subscales by Grade

		df	F	Sig.
SDLRS Total	Between Groups	4	2.202	.068
	Within Groups	351		
	Total	355		
Self-Management	Between Groups	4	4.635	.001
	Within Groups	336		
	Total	340		
Desire for learning	Between Groups	4	2.902	.022
	Within Groups	336		
	Total	340		
Self-Control	Between Groups	4	3.234	.013
	Within Groups	336		
	Total	340		

For student performance and SDLRS scores, there was a significant difference in all subscales. With the strongest association in the self-management subscale, where there was a significant difference in the scores for students attaining a failing grade (F) and students attaining all passing grades (A to C). For the desire for learning subscale, there was a significant difference in the scores for students attaining a failing grade (F) and students attaining passing grades (A, B+ and C). For the self-control, there was a significant difference in the scores for students attaining a failing grade (F) and students attaining the passing grades A and B+. These results indicate that all subscale scores of the SDRL have an influence on whether a student attains a passing grade compared to those attaining a failing grade.

Motivation over the academic years of the programme

Table 6 shows the oneway ANOVA analysis for motivation and subscales by academic year in the programme. A significant association was noted for extrinsic goal orientation the between the preclinical years 1-3 and the clinical years 4 and 5 (Table 7).

Table 6: ANOVA -Motivation and Subscales by Academic Year

		df	F	Sig.
Motivation	Between Groups	4	2.268	.061
	Within Groups	480		
	Total	484		
Intrinsic goal orientation	Between Groups	4	.828	.508
	Within Groups	480		
	Total	484		
Extrinsic goal orientation	Between Groups	4	8.621	.000
	Within Groups	480		
	Total	484		
Learning Strategies	Between Groups	4	.509	.729
	Within Groups	480		
	Total	484		
Metacognitive Self-regulation	Between Groups	4	.740	.565
	Within Groups	480		
	Total	484		

Table 7: Bonferroni's Post-hoc test -Motivation and Subscales by Academic Year

Dependent variable	Academic year (I)	Academic year (J)	Mean Difference (I-J)	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intrinsic goal orientation	1	2	1.25808	0.590	-0.61636	3.13253
		3	1.44669	0.144	-0.21444	3.10781
		4	*2.82096	0.002	0.72973	4.91219
		5	*3.57664	0.000	1.71847	5.43481
	2	1	-1.25808	0.590	-3.13253	0.61636
		3	0.18861	1.000	-1.5232	1.90041
		4	1.56288	0.392	-0.56883	3.69458
		5	*2.31856	0.006	0.41495	4.22217
	3	1	-1.44669	0.144	-3.10781	0.21444
		2	-0.18861	1.000	-1.90041	1.5232
		4	1.37427	0.471	-0.57251	3.32106
		5	*2.12995	0.004	0.43598	3.82392
	4	1	*-2.82096	0.002	-4.91219	-0.72973
		2	-1.56288	0.392	-3.69458	0.56883
		3	-1.37427	0.471	-3.32106	0.57251
		5	0.75568	1.000	-1.36174	2.87309
	5	1	*-3.57664	0.000	-5.43481	-1.71847
		2	*-2.31856	0.006	-4.22217	-0.41495
		3	*-2.12995	0.004	-3.82392	-0.43598
		4	-0.75568	1.000	-2.87309	1.36174

Self-directed learning over the academic years of the programme

There was a significant association between the SDLRS total and the self-management subscale scores and the students' academic year in the programme, (.000 and .006 respectively, Table 8). With the preclinical years having significantly higher scores than the clinical years (Table 9). There was no significant difference noted between the preclinical years or between the clinical years of the programme. However, further analysis using the Bonferroni's Post-hoc test did not show as significant results comparing each year and the subscales.

Table 8: ANOVA -SDLRS and Subscales by Academic Year

		df	F	Sig.
SDLRS Total	Between Groups	4	8.703	.000
	Within Groups	480		
	Total	484		
Self-Management	Between Groups	4	3.678	.006
	Within Groups	446		
	Total	450		
Desire for learning	Between Groups	4	1.722	.144
	Within Groups	444		
	Total	448		
Self-control	Between Groups	4	2.415	.048
	Within Groups	445		
	Total	449		

Table 9: Bonferroni's Post-hoc test –SDLR and Subscales by Academic Year

Dependent variable	Academic year (I)	Academic year (J)	Mean Difference (I-J)	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SDLR Total	1	2	-6.54897	1	-25.7156	12.6176
		3	1.40573	1	-15.5796	18.3911
		4	20.0177	0.086	-1.3656	41.401
		5	27.55817*	0.001	8.558	46.5584
	2	1	6.54897	1	-12.6176	25.7156
		3	7.9547	1	-9.5488	25.4582
		4	26.56667*	0.006	4.7695	48.3638
		5	34.10714*	0	14.6423	53.572
	3	1	-1.40573	1	-18.3911	15.5796
		2	-7.9547	1	-25.4582	9.5488
		4	18.61197	0.086	-1.2943	38.5183
		5	26.15244*	0	8.8312	43.4736
	4	1	-20.0177	0.086	-41.401	1.3656
		2	-26.56667*	0.086	-48.3638	-4.7695
		3	-18.61197	0.086	-38.5183	1.2943
		5	7.54048	1	-14.1105	29.1915
	5	1	-27.55817*	0.001	-46.5584	-8.558
		2	-34.10714*	0	-53.572	-14.6423
		3	-26.15244	0	-43.4736	-8.8312
		4	-7.54048	1	-29.1915	14.1105

Discussion

Relationship between motivation and student performance

Our study showed that intrinsic motivation was an important factor influencing whether or not a student attained a passing grade compared to those who attained a failing grade. This is in keeping with the literature. Pintrich (1999) concluded that self-regulated learning could be facilitated by the adoption of intrinsic motivational factors and hindered by extrinsic motivational factors. Data analysis supported with the post-hoc test for metacognitive self-regulation by grade shows a similar highly significant result with students with higher subscale scores for all passing grades compared with those students attaining a failing grade. To what extent the extrinsic motivational factors affected the academic performance was elucidated in this study. These findings are also supported by a meta-analysis conducted by Robbins, Lauver, Le, Davis, & Langley (2004) showing that there was a strong correlation between self-efficacy and achievement motivation and Grade Point Average in American college students. Our study was not able to show a significant difference between students with a passing grade (A, B, C) but significant for failing students verses students with any passing grade (A to C). In conclusion intrinsic motivation was confirmed to be an important factor for student performance.

Relationship between self-directed learning and student performance

There was a significant difference between student performance and all subscales of SDLRS. With the strongest association in the self-management subscale, where there was a significant difference in the scores for students attaining a failing grade (F) and students attaining all passing grades (A to C). The metacognitive subscale of the MSLQ also supports this. Self-regulation in students learning style involves goal setting, self-monitoring and self-efficacy as important contributors to their academic performance (Zimmerman, 1996). The data implies that the students in control of their learning will have active and constructive learning with a deeper approach to learning. In conclusion higher self-management scores and learning style scores have a positive effect on student performance.

Motivation and self-directed learning over the academic years of the programme

Analysis for motivation and subscales by academic year in the programme showed that there was no significant association between the total motivation scores and the academic year. However, a significant association was noted for extrinsic goal orientation between the preclinical years 1-3 and the clinical years 4 and 5. This is interesting since although the preclinical years had higher SDLR scores compared to students in the clinical years the external goal orientation was higher. This finding may need to be explored further by looking at the curriculum for both the preclinical year, which are PBL based and the pedagogical practice in the clinical years, which may vary in the different clerkships.

It was postulated that as the students progress through the clinical years, where their learning style is expected to be more self-directed through unsupervised patient contact and continued use of critical reasoning that the SDRL scores may be significantly higher than the preclinical years. This was not borne out by the study, in fact the SDLR scores were higher for the preclinical years compared to those scores for the clinical years. With the scores for the clinical years falling below the acceptable level suggested by (Fisher, Tague and King, 2001) of greater than 150. Further analysis for the subscales did not aid in elucidating any particular domain for this observation but it certainly requires further investigation. Looking at similar subscales in the MSLQ did not support this finding noted in the SDLR. Other studies looking at SDL across curricula have shown no significant difference change in SDL (Harvey, Rothman and Frecker, 2003; Samarakoon, L., Fernando, T., Rodrigo, C. and Rajapakse, S., 2013). This may be due to the assumption that students in a particular year will have similar SDLR scores. This is not the case in reviewing the data in this study. It is essential therefore to conduct a longitudinal study to truly investigate the effect of a curriculum on SDL. It may be the case that students enter the programme with a set of learning skills and the curriculum has little effect on these skills. Also of interest, it was assumed that students entering the programme from high school had lower SDLR scores this could not be fully addressed by this study as the study was conducted in the second semester of the

academic year and there was insufficient data to compare students entering the programme from high school and those entering from a degree programme.

Conclusion

In conclusion the study has shown that there is a significant positive effect of intrinsic motivation and self-directed learning on student performance. This data are compelling enough to prompt learning style investigation and interventions for failing students. This study has demonstrated a strong link between self-directed learning, intrinsic motivation and student academic performance. Although there were no demonstrable differences between the passing grades (A to C), there was a significant difference between higher intrinsic goal oriented and SDL scores for students attaining all passing grades and students with a failing grade. There was no significant difference in intrinsic motivation across the academic years but the preclinical years were more extrinsically motivated than the clinical years and a significant and negative change in SDLR noted over the academic years of the programme. A longitudinal study tracking students SDLR, motivation and performance across the programme is required to verify these important findings. If confirmed, a more in depth look at the preclinical and clinical curricula would be necessary to ensure that learning objectives, pedagogical strategies and assessment are in alignment.

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