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Academic motivation and self-concept of undergraduate optometry students

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Academic motivation enables students to face challenges in their studies and is important for student performance. Academic self-concept refers to students' perceptions of their competencies and ability to learn. The goal of the study was to evaluate academic motivation and self-concept of undergraduate optometry students. We used a mixed methods research design involving a self-administered questionnaire and follow-up semi-structured interviews. Saturated sampling was used to recruit participants. Data were analysed using descriptive and inferential statistics and thematic content analysis. The sample consisted of 166 participants aged between 18 and 24 years with more females (n = 121) and fourth year students (n = 64). The mean score for extrinsic motivation (4.91 ± 1.42) was larger than the mean scores for intrinsic motivation (4.24 ± 1.48) and amotivation (1.58 ± 1.02). There was no difference in the mean scores for motivation between the different levels of study ($p \geq 0.122$) or gender groups ($p \geq 0.100$). The mean scores for academic confidence and academic effort were 4.45 ± 0.38 and 4.51 ± 0.69, respectively. The main factors that influenced student motivation were online learning, prospect of graduation, financial independence and support systems. Optometry students have positive perceptions of their academic capabilities and competence, and are motivated to engage in their studies. Students' motivation was influenced by external factors such as higher salaries, prestigious jobs, affluent lifestyle and recognition. Optometry lecturers and curriculum developers should consider academic motivation and self-concept when interacting with students for optimal student well-being.

Contribution: This article focusses on academic motivation and self-concept of undergraduate students that may be of interest because of the ongoing corona virus disease 2019 (COVID-19) pandemic and the changes students have experienced for teaching and learning activities. Students must remain motivated to achieve their academic goals. Thus, this study can assist students to better understand how motivation affects their learning and what factors affect their motivation. Information from the study can also inform parents, lecturers and administrators on how to optimally support student growth and development as well as create learning environments better suited to the needs of students.

Keywords: academic motivation; academic self-concept; optometry students; academic motivation scale; academic self-concept questionnaire.

Introduction

Motivation is the driving force that encourages an individual to initiate, guide and sustain goal-related behaviours to meet needs and expectations (Gopalan et al. 2017). Academic motivation is an important factor that contributes towards a student's academic performance (Hakan & Münire 2014). Therefore, motivation in the educational environment enables students to face situations that pose as challenges (Gopalan et al. 2017). Academic motivation is not a single construct but consists of various factors like motivational beliefs, task values, goals and achievement motives (Steinmayr et al. 2019). Psychologists Richard Ryan and Edward Deci proposed a framework to better understand motivation called the Self-Determination Theory (SDT) (Deci & Ryan 1985). The SDT is based on three psychological needs that include autonomy (to live by self-governance), competence (to undertake a task efficiently with highest levels of knowledge and skills) and relatedness (sense of belonging and ability to feel connected to people) (Niemiec & Ryan 2009). Self-determination theory affects motivation as it has been shown that individuals are more likely to act in circumstances where they feel respected, confident, and believe that what they are doing will impact the outcome (Niemiec & Ryan 2009).

Sub-types of motivation

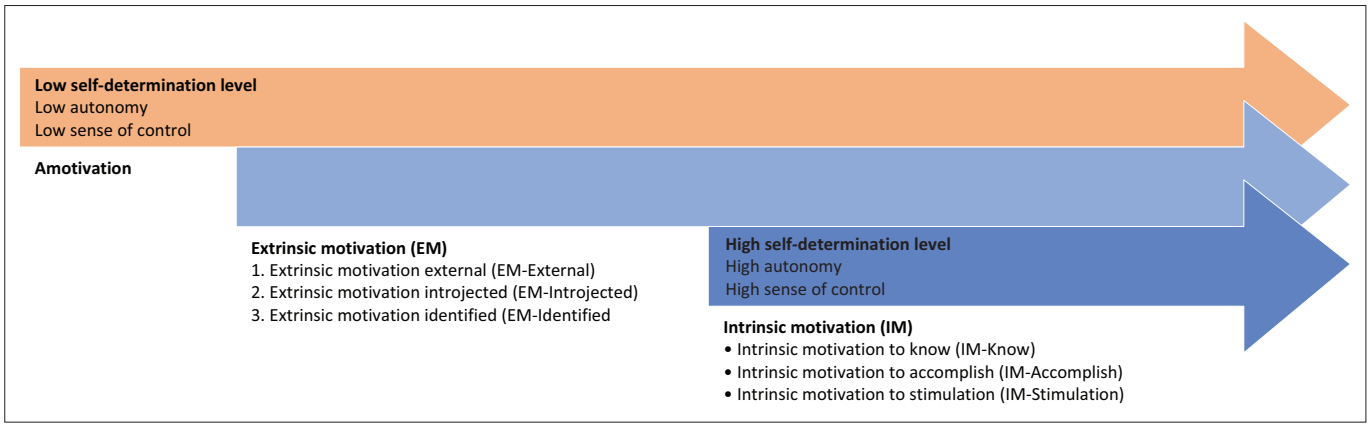
There are three types of motivation, namely intrinsic motivation (IM), extrinsic motivation (EM) and amotivation (Deci & Ryan 1985; Maurer et al. 2013). Intrinsic motivation refers to an individual's inclination to pursue a desire based on internal characteristics such as pleasure, interest and enjoyment (Ryan & Deci 2000). There are three sub-types of IM: intrinsic motivation to know (IM-Know), intrinsic motivation to accomplish (IM-Accomplish) and intrinsic motivation to experience stimulation (IM-Stimulation) (Maurer et al. 2013). The first sub-type, IM-Know, arises when an individual engages in a behaviour for the satisfaction experienced while learning or trying to understand something new. The second sub-type, IM-Accomplish, occurs when an individual engages in a behaviour for the pleasure experienced while trying to accomplish a task or create something. The third sub-type, IM-Stimulation, occurs when an individual engages in a behaviour to experience stimulating or exciting sensations. Students who are intrinsically motivated are less likely to rely on external rewards to successfully complete academic tasks (Ryan & Deci 2000).

Extrinsic motivation refers to actions that are taken to achieve a reward (Maurer et al. 2013). Students who engage in learning only to obtain a reward or avoid punishment exhibit EM (Assor et al. 2005). There are three sub-types of EM: extrinsic motivation identified (EM-Identified), extrinsic motivation introjected (EM-Introjected), and extrinsic motivation external (EM-External) (Maurer et al. 2013). The first sub-type, EM-Identified, occurs when behaviours are performed by choice as they are considered important to the individual (Guay et al. 2010). The second sub-type, EM-Introjected, is when an individual engages in a behaviour to maintain personal expectations or avoid guilt (Vallerand et al. 1992). The third sub-type, EM-External, refers to behaviours that are determined by external means such as rewards and punishment (Guay et al. 2010). Autonomous motivation, which is characterised by high levels of self-determination, is the term used to describe motivation inclusive of IM and well-adapted EM, specifically EM-Identified (Sisley 2010). It is important to note that IM and EM are not mutually exclusive, meaning that an individual does not have either IM or EM alone but can have both types of motivation. Amotivation is characterised by the lack of both IM and EM when engaging in academic activities and relates to lack of perceived competence and failure to value the activity and/or outcome (Ryan & Deci 2000). Figure 1 shows the continuum of self-determination and the different types of motivation (Souza & Silva 2021).

Academic self-concept

An individual's motivation and performance are influenced by their self-concept and self-efficacy (Bong & Skaalvik 2003). Academic self-concept refers to students' perceptions of their competencies and ability to learn within the educational environment (Cokley 2000). Minchekar (2019) reported that academic self-concept is an important indicator of academic grades and student success. Academic self-concept influences motivation, learning, and how students participate in difficult cognitive tasks and process information (Amoah, Achempong & Sefah 2021). In general, demanding tasks are more likely to be undertaken and completed by individuals with positive self-concept (Bong & Skaalvik 2003). Furthermore, academic self-concept varies as student's progress through different levels of study (Liu & Wang 2005).

Presently, academic motivation and self-concept may be of particular interest because of the ongoing corona virus disease 2019 (COVID-19) pandemic and the changes students have experienced regarding teaching and learning activities. Students must remain motivated to achieve their academic goals. Thus, this study can assist students to better understand how motivation affects their learning and what factors affect their motivation. Information from the study can also inform parents, lecturers and administrators on how to optimally support student growth and development as well as create learning environments better suited to the needs of students. There is limited literature globally on academic motivation and self-concept of optometry students. Therefore, the aim of this study was to evaluate academic motivation and self-concept of undergraduate optometry students at a higher education institution in KwaZulu-Natal, South Africa.



Source: Please see the full reference list of the article, Souza, S.P. & Silva, R., 2021, 'Validity and reliability of the Portuguese version of Mathematics Academic Motivation Scale (MATAMS) among third cycle of basic school students', *Mathematics* 9(17), 1–16. https://doi.org/10.3390/math9172049

FIGURE 1: Self-determination continuum showing the different types of motivation from least self-determined to most self-determined.

Research methods and design

Study design and setting

A mixed methods research design was employed to assess academic motivation and academic self-concept of optometry students. Mixed methods research studies use quantitative and qualitative methods to cooperatively address a common research question (Ivankova, Creswell & Plano Clark 2008). The quantitative aspect included a self-administered questionnaire while the qualitative aspect included semi-structured interviews. The study was conducted at the Discipline of Optometry at the University of KwaZulu-Natal (UKZN), Westville campus, and participants included all registered optometry students in the four levels of study. At the time of data collection, there were 259 eligible students, and saturated sampling was used to recruit participants.

Ethical considerations

Permission to conduct the study was obtained from the Humanities and Social Sciences Research Ethics Committee (HSSREC/00004101/2022) and adhered to the tenets of the Declaration of Helsinki. Gatekeeper permission was obtained from the Registrar and Academic Leader of Optometry at UKZN. All participants accessed an electronic information sheet and provided electronic consent prior to participating.

Sample size and pilot study

Statistical advice was sought from the school statistician who advised that a minimum sample size of 120 students (30 per year) was required. This estimation of the sample was calculated using a statistical software package (Stata version 17) and based on a small-medium effect size of $d = 0.25$ with probability of 95% and assuming a mean of 4 (standard deviation of 3) based on a previous study (Javaeed et al. 2019) with similar aims and methodology. After obtaining ethical approval, a pilot study was conducted to evaluate the data collection instruments and procedures on students (seven for the questionnaire and two of these for the follow-up interviews) with similar demographic characteristics that were not included in the final study sample. All queries from the pilot study were addressed prior to commencing data collection.

Data collection

Data were collected via an online questionnaire and a follow-up online interview. The questionnaire, which was created using Google Forms, was available from 27 June to 15 September 2022, and took an average of 15–20 min to complete. The questionnaire consisted of questions related to demographic information, the Academic Motivation Scale (AMS) questionnaire (Vallerand et al. 1992) and Academic Self-Concept Questionnaire (ASCQ) (Liu & Wang 2005). Responses from completed questionnaires were exported and analysed using the Statistical Package for Social Sciences (version 28), IBM, Chicago, Illinois, United States of America. Data were analysed using descriptive statistics and presented as means, standard deviations and frequencies. Inferential statistics (independent sample t-tests and analysis of variance) were used to assess for differences between the gender groups and different levels of study. A p-value of less than 0.05 was considered statistically significant. In the questionnaire, participants indicated if they were interested in participating in a follow-up online interview. Participants that agreed were contacted to confirm willingness and an interview was scheduled at a suitable date and time. The interviews were conducted via Zoom and took an average of 15–20 min to complete. Participants provided verbal consent for participation and recording of the interview. The interview data were analysed using inductive analysis and categorised into main themes and patterns that emerged from the interviews (Nieuwenhuis 2008a).

Questionnaires

The AMS questionnaire, which was developed by Vallerand et al. (1992), was used to assess academic motivation. This questionnaire compromises 28 items answered using a seven-point Likert scale (1 indicating 'does not correspond at all', 2 and 3 indicating 'corresponds a little', 4 indicating 'corresponds moderately', 5 and 6 indicating 'corresponds a lot', and 7 indicating 'corresponds exactly') (Vallerand et al. 1992). The three sub-types of IM and EM as well as amotivation are assessed by four items each in the questionnaire (Vallerand et al. 1992). In the AMS questionnaire, IM is represented by 12 items (IM-Know by items 2, 9, 16 and 23; IM-Accomplish by items 6, 13, 20 and 27; IM-Stimulation by items 4, 11, 18 and 25); EM is represented by 12 items (EM-Identified by items 3, 10, 17 and 24; EM-Introjected by items 7, 14, 21 and 28; EM-External by items 1, 8, 15 and 22); and amotivation is represented by items 5, 12, 19 and 26. Scores for the three sub-types of IM and EM as well as amotivation were calculated by summing the relevant items as per the scoring instructions in the AMS questionnaire whereby higher scores imply higher levels of motivation and vice versa (Vallerand et al. 1992). The AMS questionnaire is reliable, has strong internal consistency, and has been translated into several languages and used in different educational contexts (Black & Deci 2000; Stover et al. 2012; Souza & Silva 2021). Furthermore, the AMS questionnaire has good reliability as Cronbach alpha values between 0.62 and 0.90 have been reported for the internal consistency and temporal stability of the different sub-types of motivation (Vallerand et al. 1992). In the academic environment, students are expected to demonstrate autonomous types of motivation, specifically IM. In an early study, Black and Deci (2000) reported positive relationships between the autonomous types of motivation and student performance.

The ASCQ, which was developed by Liu and Wang (2005), was used to assess students' perception of their competencies within the academic environment. This questionnaire consists of 20 items that participants answered using a seven-point Likert scale (1 corresponding to 'strongly disagree', 2 to 'disagree', 3 to 'somewhat disagree', 4 to 'neutral', 5 to 'somewhat agree', 6 to 'agree', and 7 to 'strongly agree'). The

ASCQ assesses two aspects of academic self-concept namely, academic confidence (AC) and academic effort (AE). The AC sub-type assesses students' perceptions of their academic competence (Joyce & Yates 2007). The AE sub-type assesses students' commitment, involvement and interest in their academic work and studies (Joyce & Yates 2007). In the ASCQ, the 10 odd-numbered items (1, 3, 5, 7, 9, 11, 13,15,17 and 19) assess the AC sub-type, and the 10 even-numbered items (2, 4, 6, 8,10, 12, 14, 16, 18 and 20) assess the AE sub-type (Joyce & Yates 2007). The items in the ASCQ are worded to contain both positive and negative items to prevent participants from responding either favourably or unfavourably to all 20 items (Joyce & Yates 2007). Previous studies reporting on the validity and reliability of the ASCQ have noted Cronbach alpha values greater than 0.70 indicating good internal consistencies (Cabaguing 2018; Deveci 2018; Nursetiawati 2019). Meerah and Mazlan (2007) proposed a classification system for the mean academic self-concept score with five levels including very low (mean score 0.0 to 1.0), low (mean score 1.1 to 2.0), intermediate (2.1 to 3.0), good (3.1 to 4.0) and very good (4.1 to 5.0).

Interviews

Semi-structured interviews were conducted with 10 participants that were randomly selected from those that agreed to participate in a follow-up interview. The semi-structured interviews were conducted using an interview guide with pre-determined questions and probes based on a review of the literature related to student motivation and factors that serve as enablers and barriers to student motivation. Open-ended questions and probes were used in the semi-structured interviews as they allow for more in-depth questioning and encourage participants to elaborate on their responses (Nieuwenhuis 2008b). The interviews were recorded after obtaining permission from the participant. Furthermore, recording of the interviews allowed the researchers to focus on the content of the interview and create a verbatim transcript. These transcripts were used for data analysis and involved thematic content analysis wherein the main themes and patterns that emerged from the interviews were identified.

Results

Characteristics of the sample

A total of 166 optometry students completed the online questionnaire comprising 45 (27.1%) males and 121 (72.9%) females. When stratified for level of study, 34 participants (20.5%) were in first year, 31 (18.7%) in second year, 37 (22.3%) in third year, and 64 (38.6%) in fourth year. The age range of participants was between 18 years and 24 years, with a mean of 20.66 ± 1.50 years. The mean age for the male and female participants was 20.75 ± 1.40 years and 20.63 ± 1.55 years, respectively ($p = 0.24$). More than two-thirds of the participants lived with their parents (n = 114, 68.7%). The majority of participants reported that the highest qualification obtained by family members was a high school certificate (n = 74, 44.6%). This was followed by bachelor's degree (n = 67, 40.4%), diploma (n = 14, 8.4%), master's degree (n = 7, 4.2%). and a doctoral degree (n = 4, 2.4%).

Academic Motivation Scale and Academic Self-Concept Questionnaire results

Table 1 shows the means and standard deviations for the AMS and ASC questionnaires as well as the sub-types for the AMS. The mean score for total EM and IM were 4.91 ± 1.42 and 4.24 ± 1.48, respectively while the score for amotivation was 1.58 ± 1.02. The mean score for amotivation was approximately three times smaller than the mean scores for total IM and total EM (Table 1). With regard to the IM sub-types, IM-Know (4.78 ± 1.60) had a larger mean score than IM-Accomplish (4.25 ± 1.67) and IM-Stimulation (3.71 ± 1.61). The mean score for EM-Identified (5.48 ± 1.53) was larger than the mean scores for the other sub-types of EM (Table 1). With regard to the ASCQ results, a similar mean score was found for both AC (4.46 ± 0.68) and AE (4.51 ± 0.69).

Academic Motivation Scale and Academic Self-Concept Questionnaire results stratified for level of study and gender

Table 2 shows the mean and standard deviation scores for the AMS and ASC questionnaires stratified for level of study and gender. The mean score for EM was the largest across the four levels of study when compared with the mean scores for IM and amotivation. Participants in the second year had the largest mean scores for IM (4.59 ± 1.16) and EM (5.27 ± 1.09), while participants in the fourth year had the smallest mean scores for IM (3.92 ± 1.51) and EM (4.69 ± 1.41). The trend noted was that IM and EM gradually increased from first year to second year, and then decreased in third year and fourth year (Table 2). The mean score for amotivation was largest among participants in first year (1.74 ± 1.34) and least among participants in second year (1.39 ± 1.09). However, there was no statistically significant difference in mean scores for IM ($F = 1.960$, $p = 0.122$), EM ($F = 1.208$, $p = 0.309$), and amotivation ($F = 0.637$, $p = 0.592$) across the four levels of study. Table 2 shows that female participants had larger

TABLE 1: Means and standard deviations for the sub-types of the Academic Motivation Scale and Academic Self-Concept questionnaires.

AMS and ASCQ	Item number	Mean	SD
AMS sub-types			
IM-Know	2, 9, 16 and 23	4.78	1.60
IM-Accomplish	6, 13, 20 and 27	4.25	1.67
IM-Stimulation	4, 11, 18 and 25	3.71	1.61
Total IM	-	4.24	1.48
EM-Identified	3, 10, 17 and 24	5.48	1.53
EM-Introjected	7, 14, 21 and 28	4.13	1.76
EM-External	1, 8, 15 and 22	5.12	1.60
Total EM	-	4.91	1.42
Amotivation	5, 12, 19 and 26	1.58	1.02
ASCQ sub-types			
AC	1, 3, 5, 7, 9, 11, 13, 15, 17 and 19	4.46	0.68
AE	2, 4, 6, 8, 10, 12, 14, 16, 18 and 20	4.51	0.69

Note: The maximum score for the AMS and ASC questionnaires is 7 based on the rating scale used.

AMS, academic motivation scale; ASCQ, academic self-concept questionnaire; IM, intrinsic motivation; EM, extrinsic motivation; AC, academic confidence; AE, academic effort; SD, standard deviation.

TABLE 2: Means and standard deviations for the Academic Motivation Scale and Academic Self-Concept questionnaires stratified for level of study and gender.

Stratification	AMS			ASCQ	
	IM	EM	Amotivation	AC	AE
Level of study					
First year (n = 34)	4.25 ± 1.71	4.98 ± 1.68	1.74 ± 1.34	4.23 ± 1.03	4.31 ± 0.99
Second year (n = 31)	4.59 ± 1.16	5.27 ± 1.09	1.39 ± 1.09	4.49 ± 0.50	4.42 ± 0.55
Third year (n = 37)	4.50 ± 1.40	4.92 ± 1.42	1.56 ± 0.95	4.58 ± 0.57	4.60 ± 0.61
Fourth year (n = 64)	3.92 ± 1.51	4.69 ± 1.41	1.59 ± 0.81	4.49 ± 0.57	4.60 ± 0.58
p-value	0.122	0.309	0.592	0.156	0.168
Gender					
Males (n = 45)	3.82 ± 1.55	4.64 ± 1.60	1.77 ± 1.14	4.32 ± 0.72	4.28 ± 0.75
Females (n = 121)	4.40 ± 1.43	5.00 ± 1.35	1.50 ± 0.96	4.51 ± 0.67	4.59 ± 0.65
p-value	0.095	0.148	0.128	0.807	0.454

AMS, academic motivation scale; ASCQ, academic self-concept questionnaire; IM, intrinsic motivation; EM, extrinsic motivation; AC, academic confidence; AE, academic effort.

mean scores for IM (t = –1.680, p = 0.095) and EM (t = –1.453, p = 0.148) while male participants had a larger mean score for amotivation (t = 1.528, p = 0.1282) although these gender differences were not statistically significant. Overall, participants in the first year had the smallest mean scores for AC (4.23 ± 1.03) and AE (4.31 ± 0.99) compared with the other levels of study (Table 2). Participants in the third year had the largest mean score for AC (4.58 ± 0.57) while participants in third and fourth year showed the largest mean scores for AE (Table 2). The trend noted was that AC gradually increased from first year to third year and then decreased in fourth year. The mean AE scores also showed a similar trend with an increase from the first year to the higher levels of study. However, there was no statistically significant difference in the mean scores for AC (F = 1.764, p = 0.156) and AE (F = 1.704, p = 0.168) among the four levels of study. Female participants had larger mean scores for AC and AE than male participants (Table 2), but these gender differences were not statistically significant ($p \geq 0.454$).

Interview results

The interviews were conducted with 10 participants consisting of six females and four males. In terms of level of study, three participants were in first year, two in second year, two in third year, and three in fourth year. The themes that emerged from the interviews are presented below.

Theme 1: Impact of online learning on motivation

Participants reported that online learning had impacted their motivation and enthusiasm to learn. Almost all participants (n = 9) felt that online learning had a negative effect on their motivation to learn and engage with their studies. Participants expressed that online learning made them complacent and uninterested in their studies. One participant indicated:

> 'Online learning did make me a bit lazy, in the sense that because these videos were uploaded on Moodle then I would put it off because you could look at it any time even if it is just before the tests. So, I do think that online learning did make me a bit more complacent.' (Participant 2, female, third year student)

Another participant indicated:

> 'I did not need to push myself as hard as I would if it were on campus. I did not need as much motivation. So, I would say online learning did drop my motivation level and dropped how hard I used to work in terms of achieving my goals academically.' (Participant 9, female, fourth year student)

Another participant said:

> 'Online learning did not really motivate me and I prefer contact rather than online learning.' (Participant 8, female, first year student)

In addition, online learning also had a negative impact on participants' interest in their studies, as one participant expressed:

> 'Online learning had a really big effect. Last semester was not as good and I was not very interested compared to this semester now that we are on campus.' (Participant 4, female, first year student)

Theme 2: Factors that motivated students to work hard

All participants indicated that obtaining the Bachelor of Optometry (B.Optom) degree and the expectation of graduation were enabling factors for their motivation. For example, one participant said:

> 'Get a degree! Well, I want to obtain this degree and then probably come back for my master's degree and then probably come back for my PhD degree.' (Participant 9, female, fourth year student)

Another participant stated:

> 'Finish my degree and get on with this career.' (Participant 1, male, third year student)

Thus, participants seemed encouraged to work towards the completion of the B.Optom degree and used this as motivation when engaging with their studies. In addition, some participants (n = 4) also expressed that financial independence and being able to financially assist their families were major factors that motivated them. For example, one participant said:

> 'I just basically want financial independence.' (Participant 2, female, third year student)

Theme 3: Impact of lecturers and peers on motivation

Lecturers, mentors and peers serve as stakeholders in a student's academic life and these relationships can be beneficial and/or detrimental to students' motivation. Participants (n = 8) stated that their lecturers and peers increased their motivation to engage with their studies. Overall, participants rated the influence of their peers slightly higher than the influence of their lecturers and/or mentors. Despite this, two participants mentioned the positive impact their lecturers had on their motivation levels. For example, one participant stated:

> 'My lecturers constantly tell you what you can improve on … so they keep me going and they keep me motivated.' (Participant 5, male, fourth year student)

Another participant expressed that passionate lecturers tend to transfer their passion to their students as she stated:

> 'It is mostly their lecturers' passion for their work so it really influences me to want to do better and also their encouragement and their effort in trying to make us catch up with work. So that also influences me to put more effort in my studies.' (Participant 1, male, third year student)

In contrast, one participant expressed how lecturers can be demotivating and sometimes might not contribute to high academic motivation levels among students. She said:

> 'I find certain lecturers demotivating, I would not say they have played a very big role in my motivation besides being disciplined because I know that if I do not do something, the consequences will be there. They do not motivate me but they keep me disciplined.' (Participant 9, female, fourth year student)

Theme 4: Influence of parents and/or guardians on motivation

Participants (n = 8) expressed that their parents and/or guardians often provided emotional support by contacting them and playing a supportive role in their studies. One participant expressed:

> 'My mom gives me motivation, she calls to check up on me, ask me how I am doing in university.' (Participant 5, male, fourth year student)

Another participant concurred emphasising that the support system provided by her parents enables her to manage her emotional and mental well-being.

She stated:

> 'They ensure that I am emotionally and mentally okay every single day. They ensure that I know that there is a support system that I can turn to.' (Participant 9, female, fourth year student)

Two participants mentioned that their parents and/or guardians assisted them financially and that allowed them to focus on their studies without worrying about the costs involved in their B.Optom degree. One participant said:

> 'They do help financially to put out the financial burden and that helps me focus more on my studies and stay motivated in my schoolwork.' (Participant 1, male, third year student)

However, one participant mentioned that her parents are not supportive, and this has a negative impact on her motivation. She said:

> 'They do not check up on me, they do not check up on my academic performance, they do not even ask me about my university life and that demotivates me because it makes me feel like they are not proud that I am in university.' (Participant 3, female, first year student)

Theme 5: Motivation to pursue the B.Optom degree

More than half of the participants (n = 6) stated that they chose to pursue the B.Optom degree because they wanted to create a positive impact in people's lives and within their communities. One participant said:

> 'I have realised how impactful the B.Optom degree is to our community. So, the B.Optom degree is something that I felt could reach out to people and help while also having a career.' (Participant 1, male, third year student)

Another participant said:

> 'I have always wanted to be a helping hand in the community.' (Participant 9, female, fourth year student)

Many participants (n = 6) indicated that they chose to study the B.Optom degree as it is in the field of health sciences. One participant stated that the relatively short duration of study (four years) for the B.Optom degree was a motivating factor. For example, she stated:

> 'I wanted to do something in health sciences, but I also did not want something that was too long to study.' (Participant 4, female, first year student)

Discussion

Motivation is important for student success as it influences performance (Petersen, Louw & Dumont 2009; Thoka 2020) and retention in higher education institutions (Friedman & Mandel 2011). There is a positive relationship between academic motivation and self-concept as students who have positive perceptions of their abilities are more motivated and have better academic performance (Ahmed & Bruinsma 2006). Despite relaxation in COVID-19 pandemic restrictions across the world, the on-going pandemic continues to have a considerable impact on the global economy, livelihoods, education, physical and mental health, and social lifestyles. In the higher education sector, the unprecedented changes in teaching and learning activities over the last few years are likely to have affected students' motivation and engagement in their academic studies. Few studies have reported on academic motivation of students (Buari & Alim 2020; Fatima et al. 2021; Hegarty 2010; Isiksal 2010; Javaeed et al. 2019; Muza, Muhammad & Aliero 2021; Orvis et al. 2018). However, little is known about the academic motivation and self-concept of undergraduate optometry students and the factors that influence these characteristics.

In this study, the AMS was used to investigate the three sub-types of academic motivation and the mean score for EM was larger than the mean scores for IM and amotivation. Other studies involving nursing students in Pakistan (Fatima et al. 2021), science and technology students in Nigeria (Muza et al. 2021), and education and business students in the United States of America (USA) (Hegarty 2010) also reported that EM was the most common type of motivation in their samples. Intrinsic motivation stems from internal factors and includes the desire to know, accomplish things and experience stimulation for personal fulfilment while EM stems from external factors and includes the desire to earn a reward (higher salaries, prestigious jobs and affluent lifestyle), praise and recognition or avoid punishment (Maurer et al. 2013; Ryan & Deci 2000). Fatima et al. (2021) suggested that students may have higher levels of EM as they are motivated to work hard and secure their degrees rather

than being curious or engaged in understanding their studies. Previous studies have noted lower levels of enthusiasm, motivation and satisfaction in students because of changes in teaching and learning activities as a result of the COVID-19 pandemic (Almendingen et al. 2021; Plakhotnik et al. 2021). Optometry students studying at UKZN also experienced drastic changes in their academic activities with the adoption of online learning during the COVID-19 pandemic. In South Africa, the phasing in of students back into higher education institutions was implemented based on Regulation No. 652, dated 08 June 2020 under adjusted alert level one (Ngoatle, Mothiba & Ngoepe 2022). The results of this study suggest that changes in teaching and learning activities that optometry students experienced may not have had too much of an effect on their motivation levels. However, it is likely that different results may have been obtained if motivation levels of these students were evaluated during the more stringent period of lockdown, particularly adjusted alert levels three to five.

Intrinsic motivation is important because it is positively related to academic achievement and persistence when faced with challenging tasks (Taylor et al. 2014). In this study, IM-Know showed the largest mean score followed by IM-Accomplish and IM-Stimulation. Fatima et al. (2021) and Baker (2004) also noted the same trend in the sub-types of IM where IM-Know had the largest mean score and IM-Stimulation had the smallest mean score. The results for IM-Know and IM-Accomplish imply that optometry students are motivated to study in the B.Optom degree because the knowledge and skills in the B.Optom programme may be interesting and they feel a deep sense of self-satisfaction when they surpass challenges and achieve their academic goals. The relatively smaller mean score for IM-Stimulation in this study indicates that optometry students engage less in behaviours (spoken and written) to experience stimulating or exciting sensations. An environment that fosters communication whereby students are encouraged to ask questions and share their thoughts would assist in improving the learning environment and therefore promote IM-Stimulation (Fatima et al. 2021). Therefore, it is recommended that optometry lecturers design and implement teaching and learning activities such as debates, journal clubs and reflective assignments particularly on contemporary topics that will help students to develop enhanced verbal and written behaviours needed to strengthen IM-Stimulation.

Students that are driven by EM work hard to achieve better academic grades (Adamma, Ekwutosim & Unamba 2018). In this study, EM-Identified had the largest mean score followed by EM-External and EM-Introjected. Extrinsic motivation-Identified relates to when an individual sincerely values a behaviour and/or activity even though they are not engaging in these behaviours and/or activities because they like them (Maurer et al. 2013). This implies that optometry students may be motivated to study in the B.Optom degree because they value it and/or obtaining higher academic grades despite not enjoying or liking the process. The results reported by Javaeed et al. (2019) and Baker (2004) aligned with the results of this study as they also noted that EM-Identified had the largest mean score. Javaeed et al. (2019) proposed that this may be attributed to students in medical and allied health degrees being more study- and career-oriented than students in other degrees. In contrast, Fatima et al. (2021) found that EM-External (4.01 ± 1.12) had the largest score when compared with EM-Identified (3.81 ± 1.29) and EM-Introjected (3.52 ± 1.25). The researchers suggested that this trend may be because of their participants being more motivated to secure a good salary and job (Fatima et al. 2021). Other studies have also shown that EM-External had the largest mean score for EM, implying less autonomous motivation (Algharaibeh 2021; Orvis et al. 2018).

Amotivation presents as disinterest and/or minimal effort in academic activities. Amotivation has been associated with academic burnout and increased stress levels, thereby reducing academic engagement (Baker 2004; Buari & Alim 2020). Students with higher levels of amotivation tend to have a negative attitude towards their academic activities and this leads to decreased academic performance (Htoo 2014). In the present study, the mean score for amotivation was almost two times lower than the mean scores for IM and EM. This implies that optometry students are motivated to engage in their studies because they feel that it will better prepare them for their career as optometrists and allow them to acquire a good salary and/or prestigious job. The low scores for amotivation are encouraging as they imply that optometry students are actively motivated to engage in their studies rather than having no aspiration to work towards the B.Optom degree. Other studies have also found that the mean scores for amotivation were the lowest (Baker 2004; Fatima et al. 2021). A possible reason for the lower mean scores for amotivation may be related to medical and allied health science students generally showing a strong sense of altruism and striving to make a positive impact in society (Poirier & Gupchup 2010).

Academic self-concept is positively affected by success attained in previous academic settings such as school (Marsh & Yeung 1997). These successful academic experiences can impact a student's motivation for learning and academic activities (Prince & Nurius 2014). Higher academic self-concept is associated with higher academic performance because of increased levels of autonomous motivation (Guay et al. 2010). In this study, students had high academic self-concept scores that were classified as very good using the classification system proposed by Meerah and Mazlan (2017). These results are not unexpected as the mean scores for the more autonomous aspects of motivation (IM and EM-Identified) were also high in this study. This suggests that optometry students are confident in their studies, not intimidated by failure, and self-regulate their learning. These findings are similar to previous studies (Deveci 2018; Meerah & Mazlan 2017) that also showed high academic self-concept scores. As academic self-concept is crucial for motivation, it is important to increase student awareness of a healthy self-concept as this may encourage them to be more confident and put more effort into their studies.

In the present study, participants in the second year had the insignificantly higher mean scores for IM and EM than participants in the fourth year. This is in contrast to the results reported in other studies (Buari & Alim 2020; Isiksal 2010) where fourth year optometry students had the largest scores for IM and EM. This suggests that senior students show lower levels of motivation compared with junior students and may be owing to the greater academic work demands that senior students experience compared with junior students. Fourth year students may also be concerned about other factors such as securing a job, meeting the B.Optom degree requirements, attending decentralised clinical training and worrying about family expectations thus influencing their IM and EM. First year students had high mean scores for amotivation and this may be attributed to them being exposed to more basic science modules rather than optometry modules. Therefore, first year students may not value the B.Optom degree as much as senior students who are exposed to preclinical and clinical optometry modules. Furthermore, higher levels of amotivation may be attributed to poorer psychosocial adjustment to university life (Baker 2004) that first year students are more likely to experience than students that have been at university for more than one year (Dlamini et al. 2020). First year students also had the smallest academic self-concept scores and therefore more support and monitoring are recommended to help them better adjust, develop higher self-concept and excel in their studies.

In this study, female students had insignificantly higher mean scores for IM, EM and academic self-concept than male students. These findings are consistent with other studies that noted larger IM scores in female students (Javaeed et al. 2019). The larger scores in female students could be related to a greater desire for financial independence and personal accomplishment. The mean score for amotivation in male students was slightly larger than in female students consistent with the gender differences noted in chemistry students in the USA (Orvis et al. 2018) and physical education students in Poland and Ukraine (Javaeed et al. 2019). In contrast, Hakan and Münire (2014) found larger amotivation scores in female students and male students. It is encouraging to note that the mean scores for amotivation in both gender groups were less than the mean scores for IM and EM, suggesting that optometry students have low levels of amotivation towards their studies. It is recommended that optometry lecturers continue to engage in teaching and learning activities and role-modelling behaviours that are conducive to optometry students retaining high levels of motivation.

From the interviews, the main factors that influenced student motivation were graduation, financial independence, support systems and online learning. Peers, parents and lecturers were the main role players in a student's life with participants often reporting that their peers motivated them to put more effort into their studies as noted previously (Nichols & White 2001). Parents provided both emotional and financial support which helped participants to cope better with their studies and worry less about the financial burden. Moneva et al. (2020) investigated how parents impacted academic achievement and found that students with more parental support and motivation performed better. Lecturers also impacted student motivation positively by displaying passion and enthusiasm and negatively by not considering students feelings. Gee (2018) emphasised that lecturers need to be effective motivators and facilitators who are competent and approachable to positively influence students. Students found that online learning negatively impacted their motivation as it made them complacent and uninterested in their studies as noted previously (Almendingen et al. 2021; Plakhotnik et al. 2021). It is recommended that good relationships between students, lecturers and parents be encouraged in the learning environment to foster autonomous motivation and enable students to perform optimally.

Strengths of this study included the use of a mixed methods research design that allowed for more comprehensive data collection and a pilot study prior to data collection. The AMS and ASC questionnaires have been widely used and validated in previous studies (Cabaguing 2018; Deveci 2018; Nursetiawati 2019; Souza & Silva 2021; Stover et al. 2012). This study provides baseline data on the academic motivation and self-concept of undergraduate optometry students in South Africa. Limitations include that the study was conducted at only one higher education institution. In addition, the study did not focus on socioeconomic and sociocultural factors that are likely to influence student motivation. The relationship between academic motivation and academic performance was also not evaluated. Therefore, future studies should include optometry and allied health science students in other universities, compare academic performance and motivation, and evaluate the influence of sociocultural and socioeconomic factors on motivation. Furthermore, the AMS and ASC questionnaires are useful screening tools to identify students with unsatisfactory motivation and self-concept that may benefit from additional support and monitoring during their studies.

Conclusion

This study evaluated academic motivation and self-concept of undergraduate optometry students at a higher education institution in KwaZulu-Natal. Extrinsic motivation was the most dominant sub-type of motivation suggesting that student motivation was influenced to a greater extent by external factors (higher salaries, prestigious jobs, affluent lifestyle and recognition) to earn their B.Optom degree. Despite this, the findings for academic motivation are encouraging as they imply that optometry students are actively motivated to engage in their studies rather than having no aspiration to work towards their degrees. The findings for academic self-concept were high implying that optometry students have positive perceptions of their academic capabilities, competence and interest in their academic work. Therefore, it is important that optometry lecturers and curriculum developers consider motivation and self-concept when interacting with students. Furthermore, academic personnel should develop support workshops and programmes to enhance awareness of the importance of academic motivation and foster development of more autonomous motivation. This is crucial to improve

student well-being and create environments that allow for optimal academic performance.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

T.W. was the study leader. N.R. and S.N. provided feedback on the study design and procedure. A.S., N.N., S.M., A.M., M.S. and S.B. performed data collection. T.W., A.S., N.N., S.M., A.M., M.S., S.B., S.N. and N.R. worked jointly on writing the manuscript. All authors read and approved the final manuscript prior to submission.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author, N.R., on reasonable request.

Disclaimer

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