

Assessment of teaching strategies and learning style preferences of lecturers and oral hygiene students at a higher education institution in South Africa

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ABSTRACT

Introduction

Lecturers and students at tertiary institutions have different teaching strategies and learning styles (TS&LS) and it is essential to align these strategies and styles to ensure that students understand the concepts they are taught. This study was conducted to assess and compare the TS&LS preferences among lecturers and undergraduate oral hygiene students at a university in South Africa.

Methods

A cross-sectional study was conducted, inviting all full-time lecturers (35) and undergraduate dental hygiene students (40) registered for the 2021 academic year to participate. The visual, auditory, reading and kinesthetic (VARK) teaching and learning questionnaires (version 7.8) for lecturers and students respectively was utilised to capture the necessary information. This is a validated questionnaire and consists of a variety of questions which students complete using a multiple-choice approach. SPSS statistical package, version 27 was used for statistical analysis with a significance of $p \leq 0.05$.

Results

Twenty-seven (27) lecturers (77%) and 40 students (100%) completed the questionnaire. The highest mean teaching scores were in visual (6.44) and auditory (6.22) teaching styles. The highest mean learning scores was auditory (6.43) and visual (5.98). The kinesthetic sensory modality constituted the lowest mean score in both lecturers and students. The majority of lecturers (63%) preferred using a single mode of teaching while 77% of students preferred learning using a multimode approach.

Conclusions

The most common teaching and learning scores corresponded with each other. The preferred teaching strategy of lecturers was unimodal while the majority of students preferred a multimodal means of teaching. As a result, to improve student understanding and learning lecturers should use multimodal means of teaching.

Keywords

Learning styles, oral hygiene students, teaching methods, teaching styles, visual, aural, read/write and kinesthetic questionnaire.

INTRODUCTION

The emergence of numerous teaching strategies and learning styles (TS&LS) has brought increasing attention to the idea that students learn in diverse ways and that one approach to teaching does not work for every student or even most students.¹ A learning style is defined as "characteristic cognitive, effective and psychosocial behaviours that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment".² It is therefore essential to determine the TS&LS of lecturers and students to ensure that effective learning takes place. A mismatch between TS&LS can lead to discouragement of the course, less effective learning and underperformance by students.³

In modern education, there has been a paradigm shift from a focus on teacher-centred learning to student-centred learning. This curriculum change places a greater emphasis on lecturers to implement learning activities based on students' preferred learning styles, rather than their own preferred teaching method.⁴ After a thorough literature review, and based on the lack of a gold standard, the VARK survey was chosen as the measurement tool. VARK was developed in the 1990s based on the premise that humans accumulate and identify environmental knowledge through: visual (observing), auditory (listening), reading (reading and writing) and kinesthetic (tactile sensory involvement).⁵ The VARK questionnaires have been used in previous studies to help lecturers identify their preferred teaching styles and to improve on their least preferred teaching styles.^{6,7,8} The VARK approach has been shown to be effective in determining the TS&LS and is considered one of the most acceptable means when collecting data on teaching and learning, and allows lecturers to be more flexible in their teaching and adapt their teaching style to their audience of learners.^{7,9} For this reason, lecturers need evidence-based data to support modifications in curricular design, including

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teaching methods that will not only enhance student learning but also find the balance between each learning dimension. In addition, it will also promote opportunities for a learning environment that is sensitive to different styles and not simply reflect how they or their students like to learn.¹⁰ Although many studies have been conducted on TS&LS of medical and nursing students, there are few studies conducted on dental hygiene students using the VARK questionnaire.^{11,12}

There are two types of the VARK questionnaire: one for lecturers and one for students. These questionnaires are based on interactions and responses to the teaching and learning environment of lecturers and students and it attempts to categorise them into four categories: Visual (teach and learn by observation and visual presentation, such as diagrams, pictures and figures); Aural or auditory (teach and learn through listening and verbal instructions); Reading/writing (those who teach and learn best by notes or reading written or printed texts); and kinesthetic (those who teach and learn by practical examples through gaining of experience and by manipulation of objects during a physical process).¹³ These questionnaires have been used in previous studies and have shown to be both valid and reliable.^{12,14,15}

This study was conducted at a higher education institution in South Africa. The dental hygiene degree, Bachelor of Oral Hygiene (BOH), is a full-time three-year degree which entails didactic teaching, outreach activities, clinical service rendering, research and seminar presentations. The oral hygienists are trained on the same platform as dentists and, as a result, the teaching staff comprise dentists, dental hygienists and dental specialists.

The students who attend the higher education institution come from a variety of diverse backgrounds and cultures. Many students from very low socioeconomic backgrounds and limited educational resources are combined with students from high socioeconomic backgrounds and this impacts on their learning styles and interactions with fellow students. As a result, it is important to identify the learning styles of undergraduate students to assist those who are facing challenges when trying to cope at a higher educational institution.

The present study was carried out to identify the diversity of TS&LS preferences among lecturers and registered undergraduate dental hygiene students at one institution in South Africa. In addition, to determine the prevalent TSs in order to guide staff to improve the students' learning experience.

Thus, this study will have a great impact on both South African and international research by increasing the body of knowledge of the heterogeneities in TS&LS and the implications on students and teachers. Lecturers can apply these results in their own settings as developing countries have students from diverse backgrounds.

MATERIAL AND METHODS

This was a descriptive cross-sectional study completed in 2021. The sample included all lecturers who taught the dental hygiene students (n=35) and all of the dental hygiene students (n=40) registered for the BOH degree in the 2021 academic year. The questionnaire and informed consent were hand delivered to lecturers and students in person

together with an information letter explaining the purpose of the study and their right to voluntary participation. Those willing to participate were informed that there were secured boxes placed outside the researcher's office in which to return the questionnaire and the signed forms. No names were required on the questionnaire and these papers could be dropped off at any time at their convenience.

Data was collected using the English version of the visual, aural/auditory, read/write and kinesthetic (VARK) teaching and learning questionnaires (version 7.8) for lecturers and students respectively (Fleming, online). Each questionnaire consisted of 16 multiple-choice questions, each having four choices. These choices correspond to the four sensory modalities which are measured by VARK. The participants could select one or more of these choices, based on the sensory modalities which are preferred by them, to either teach or learn new information. According to individual preference to TS&LS, a person can be classified as unimodal if they show predominantly one T&L preference (eg only visual) or multimodal if they prefer two or more TS&LS. Some individuals prefer to teach or learn with a combination of two (bimodal) or three (trimodal) TS&LSs. Multimodal lecturers and learners do not have a dominant preference for any single method; instead, they use all of the four modes (Fleming).⁵ In addition to the VARK questionnaire, demographic data comprising age, year of study for students and years of experience for lecturers was also collected.

DATA ANALYSIS

Data was entered and processed by using the Statistical Package for the Social Science (SPSS) software, version 27. Data was reported as percentages of lecturers and students in each category of TS&LS preference. Quantitative variables were summarised as proportions, frequencies and means with their standard deviations, range and percentages. The level of significance was set at $p \leq 0.05$.

The study was approved by the research and ethics committee of the institution (264/2021) and written informed consent was taken from all participants before enrolling them for the study. The questionnaire data was kept confidential and respondents were assured of their right to withdraw from the study at any time without negative consequences.

RESULTS

A total of 27 lecturers and 40 students completed the questionnaire (response rate was 77% and 100% respectively). The demographic data of lecturers and students is reported in Table 1.

Table 1. Demographic data of participants.

| Students (n=40) | |
|---------------------|---------------------|
| Age in years | 20.38 (± 1.6) |
| Year of study | |
| First year | n=20 |
| Second year | n=11 |
| Third year | n=9 |
| Lecturers (n=27) | |
| Age in years | 44.5 (± 9.76) |
| Experience in years | 10.19 (± 5.8) |

Table 2. Mean modal scores for lecturers and students.

| Mode | Lecturers mean (±Std dev) score (n=27) | Students mean (±Std dev) score (n=40) |
|--------------|--|---------------------------------------|
| Visual | 6.44 (±2.38) | 5.98 (±2.57) |
| Auditory | 6.22 (± 2.68) | 6.43 (±2.88) |
| Read & write | 5.07 (±2.73) | 4.83 (±2.04) |
| Kinesthetic | 4.96 (±1.81) | 4.70 (±2.67) |

The mean modal scores for students and teachers are shown in Table 2. The highest mean score for students was via the auditory route and the lowest mean score was for the kinesthetic route. For lecturers, the highest mean score for teaching was through visual means followed closely by the auditory route. The kinesthetic mode scored the lowest mean scores for both lecturers (4.96) and students (4.70). The most common VARK mode distribution among students was bimodal (32%), followed by both trimodal and quadmodal with (23%) respectively. Three-quarters (77%) of the students preferred using a multimodal learning style with 9 out of the remaining 31 (29%) being able to learn with all four modes. The majority of lecturers (63%) preferred unimodal (single) sensory modality for teaching, while of the remaining 37%, 22% preferred teaching incorporating all four modes (Table 3).

Table 3. Frequency of different learning styles among students and learners.

| Modal | Lecturers % (n=27) | Students % (n=40) |
|------------------------------|--------------------|-------------------|
| UNIMODAL | | |
| V | 5 (19) | 1 (3) |
| A | 6 (22) | 7 (17) |
| R | 3 (11) | 1 (3) |
| K | 3 (11) | 0 |
| Total Unimodal % (n) | 17 (63) | 9 (23) |
| BIMODAL | | |
| V+A | 1 (4) | 7 (17) |
| V+R | 2 (7) | 1 (3) |
| A+K | 0 | 3 (8) |
| R+K | 0 | 1 (3) |
| V+K | 1 (4) | 0 |
| A+R | 1 (4) | 1 (3) |
| Total Bimodal % (n) | 5 (19) | 13 (33) |
| TRIMODAL | | |
| V+A+K | 0 | 2 (4) |
| V+R+K | 0 | 2 (4) |
| V+A+R | 1 (4) | 5 (13) |
| Total Trimodal % (n) | 1(4) | 9 (23) |
| QUADMODAL | | |
| V+A+R+K | 4 (15) | 9 (23) |
| Total Quadmodal % (n) | 4 (15) | 9 (23) |
| TOTAL % (n) | 77 (27) | 40 (100) |

The correlations between age and modal categories yielded no significant differences ($p>0.05$).

DISCUSSION

A total of 40 students and 27 lecturers completed the questionnaire (response rate=100% for students and 77% for lecturers). The high student response rate achieved could be due to the fact that the researcher visited each class after lectures and reminded students to complete the questionnaire. The response rate from the lecturers was relatively high as well and this could be due to numerous reminders sent to lecturers to complete the questionnaire. The constant feedback and the initial explanation of the study rationale also proved a positive means of increasing the response rate. It is therefore suggested that if academics want to carry out research among staff and students, regular briefing sessions should be held to inform participants of the study, to answer questions and to offer questionnaires on a repeated basis.

The mean auditory (6.43) and visual (5.98) scores were the highest for students. This implied that most students prefer to learn through listening and with visual aids. Among the lecturers, the highest mean score was observed in visual (6.44) followed by auditory (6.22). This showed that there is a strong alignment between TS&LSs of the lecturers and the students. The common combination of learning modalities among the bimodal and trimodal group was highest for visual and auditory (17.5%). This showed that most learning occurred through PowerPoint or video presentations. This could be due to the historical teaching that occurs throughout the learner's education journey from school to higher training institutions; however, more research is required on this matter. Most of the lecturers who preferred to teach using two modes chose Visual and Reading (7.2%). This indicated these lecturers would use visual aids and hand out notes for students to read. It placed emphasis on the students to go and read through the notes to understand concepts they may have not grasped.

The trimodal learning preference showed the highest (12.5%) in a Visual + Auditory + Read/write (VAR) combination. However, in other similar studies, among the trimodal learning styles, VAK¹⁰ and ARK¹⁶ were the most preferred. This could be due to the sample population and types of students included in those studies. It was surprising to note that very few students preferred to learn through the kinesthetic modality, given that oral hygiene is a degree in which students need to learn practical techniques and clinical skills. This could be due to the historical teaching and learning they were exposed to during their primary and high schooling years. Only 4% of lecturers reported to use a trimodal approach using V+A+R. This confirms that lecturers prefer having didactic lectures with visual aids and handing out notes for students to read through. The majority of students were multimodal learners (77%) with 23% of them preferring to learn using all of the four learning modalities (quadmodal). These findings are similar to other studies that have reported a predominant multimodal style of learning among medical and allied health students across the world.^{3,10,16} The kinesthetic modality of learning constituted the lowest mean score in both lecturers and students. This was in contradiction to other similar studies on dental students which reported that dental students preferred the kinesthetic as a single mode of learning, followed by multiple modes.^{11,15}

Being able to learn using multimodal techniques is useful as students are exposed to a variety of lecturers who might use

a single mode of teaching and this could negatively impact on the students' progress and understanding.^{17,18}

CONCLUSION

The majority of students preferred to learn using the auditory route. For lecturers, the majority reported to teach using the visual means followed by the auditory route, for example demonstrating and PowerPoint presentations. The kinesthetic mode scored the lowest mean scores for both lecturers and students. The preferred teaching style of lecturers was unimodal while the majority of students preferred a multimodal means of teaching. As a result, to improve student understanding and learning lecturers should use multimodal means of teaching. Students should be taught using different methods to ensure that they understand and comprehend the content and skills expected of them.

RECOMMENDATIONS

Students should receive orientation on the types of TS&LS when they register at higher learning institutions. This could better prepare them for self-understanding and realisation regarding their own LSs and what is most appropriate for them. The programme should include assessments such as the VARK, to identify their learning preferences and to empower them to use different learning preferences. This would improve their learning skills and create more competent students and lifelong learners. This will further assist them as they progress and prepare them for different types of lecturers and different types of learning modalities. Lecturers should also receive regular workshops to identify their teaching styles and to provide support in order for them to expand their type of teaching modes. This will assist them in reaching out to more students and ensuring more students can grasp and apply the content they are teaching. Lecturers should also identify weak students and assist them in their learning and understanding to ensure students from different backgrounds are accommodated. Test marks (assessments) could be used as indicators to identify weak students early on in their academic careers and initiate teaching programmes to assist them. These could include peer mentoring, tutorial sessions, one-on-one sessions and additional resources.

The realisation that people learn habits and practices in different ways is essential when providing oral health education and instructions to patients and communities.

Oral health practitioners must be aware that patients/communities learn using different methods and, hence, they should provide health education using different mediums. Pamphlets, posters, videos and hands-on methods should be combined when offering health education. This would ensure patients, irrespective of their learning style, will be accommodated.

CONFLICT OF INTEREST

The authors declare there are no conflicts of interest.

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CPD questionnaire on page 174

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.

