ORIGINAL ARTICLE

MULTIPLE INTELLIGENCE AMONG HEALTH PROFESSIONALS STUDENTS IN SELECTED HEALTH SCIENCE INSTITUTE, KATHMANDU

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ABSTRACT

Introduction: Health professionals' education often uses traditional teaching methods like lectures, which may not meet the diverse learning needs of students. Gardner's Theory of Multiple Intelligences highlights nine types of intelligence that affect how students learn. This study aims to analyze of multiple intelligence among Health professional students.

Method: A descriptive cross-sectional design was carried out among 275 student in Manmohan Memorial Institute of Health Sciences, Kathmandu using non-probability purposive sampling technique. Data was collected through self-administered questionnaire technique by using Gardner's Multiple Intelligence Test and VAK learning styles model and analyzed by descriptive and inferential statistics using SPSS 25. Ethical approval was taken from NECHO IRC.

Results: Bodily-kinesthetic intelligence had the highest mean score (6.0), followed by naturalist intelligence (5.8). Female students scored highest in kinesthetic learning style (10.2) and bodily-kinesthetic intelligence (6.0) but lowest in linguistic, spatial, and musical intelligence (4.9). Bachelor of Pharmacy students had the highest visual learning style score (10.7), while BSc Nursing students had the lowest linguistic intelligence score (4.4). Intrapersonal intelligence negatively correlated with visual learning style (r = -0.161, P = 0.006) and positively with kinesthetic learning style (r = 0.213, P = 0.001). Age had positive correlation with linguistic (r = 0.139, $P = 0.025$), bodily-kinesthetic (r = 0.151, P = 0.015), interpersonal (r = 0.239, P = 0.000), and naturalist intelligence (r = 0.212, $P = 0.001$). Among females, kinesthetic learning style positively correlated with intrapersonal intelligence (r = 0.256, $P = 0.000$), whereas in males, spatial intelligence negatively correlated with auditory learning style (r = -0.266, $P = 0.050$).

Conclusion: Bodily-kinesthetic and naturalist intelligences were the highest among students, with distinct gender and program-specific variations in learning styles and intelligences. Significant correlations between learning styles, intelligences, and demographic factors suggest the need for tailored teaching approaches.. Thus, Educators should adopt multimodal teaching strategies that align with diverse learning styles and intelligences to enhance academic outcomes

Key words: *Health Professional students ; Multiple Intelligence ; Kathmandu*

INTRODUCTION

Howard Gardner's Multiple Intelligences (MI) theory explains that individuals possess diverse types of intelligences, challenging the traditional view of a singular cognitive capacity. These intelligences include linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalistic, and existential intelligences. Each person exhibits a unique combination of these intelligences, influencing their learning preferences and problem-solving approaches [1-2].

Traditional teaching methods in health professional education often follow a " one size fits all" approach, primarily utilizing lectures and slide presentations. This methods may not address diverse learning needs of students. Howard Gardner's Theory of Multiple Intelligences proposes various types of intelligence, such as linguistic, logical, mathematical, spatial, bodily -kinesthetic, musical, interpersonal, intrapersonal, naturalistic and existential types of intelligence [3].

Goal of an educators is to ensure our students' success. Making a positive difference in the life of a youngster is one of the reasons we chose a career in education and remain educators. Due to this fundamental motivation, teachers have been exploring multiple intelligences (MI) theory as a tool that helps more students succeed in school. Psychologists created these theories of intelligence as tools for their research, but educators around the world are using them with enthusiasm as a teaching tool. Multi-intelligence (MI) theory brings a pragmatic approach to defining intelligence and helps us use students' strengths to help them learn. The scholastic hierarchy of many classrooms is characterized by a pecking order of winners and losers. According to MI theory, all students are smart, but they are smart in

different ways. It is possible for every student to succeed. While smart students read and write well, there are also students with different talents who are intelligent in their own way. Aside from improving student learning opportunities, MI also provides adults with more opportunities to grow professionally and personally. Teachers are finding this to be true [4-5].

The Multiple Intelligences Inventory revealed that approximately one third of students were disengaged from learning because their active learning strategies were incompatible with their preferred intelligences. By designing lessons incorporating different active learning strategies, the instructor hoped to engage more students and foster self-awareness among them [6].

Although, many study have been conducted to analyze multiple intelligence among school going students [7-8], there have been very few studies to analyze prevalence of various types of multiple intelligences among medical students. One of the study conducted by Lobo et al found out that interpersonal intelligence was dominant multiple intelligences among students of Bachelor of Medicine and Bachelor of Surgery (MBBS), BDS (Bachelor of Dental

Studies) , B Pharma (Bachelor of Pharmacy) and BSN(Bachelor of Science in Nursing) of Ras Al Khaimah Medical and Health Sciences University, UAE. The second most dominant multiple intelligence was intrapersonal among medical students [9].

Changing roles in undergraduate medical education require the provision of appropriate education for future health professionals who represent one element of the multidisciplinary health management team. Thus, it is widely recognized today that undergraduate health professionals need to be revisited and revised to include instruction to develop and incorporate these other skills and competencies.

METHODS
A descriptive cross-sectional research design was used to assess the multiple intelligence and Learning Styles among students of MMIHS during the period of 12 weeks from 2081/01/10 - 2081/03/15. Non probability convenience sampling was carried out for the selection of 261 student from BNS (36) ,BSN (78) ,BPH (51),Bsc MLT(65) and B Pharm (31) . An ethical approval obtained from institutional review committee (IRC)MMIHS.
The voluntary consent was taken and the data was collected by the Self-Administered Questionnaire Method through the structured questionnaire regarding sociodemographic characteristics .

The Multiple Intelligences Test, was used to collect data from the respondents. This study had three performa . Proforma I collects data for personal variables, including gender, age, address and educational qualification. Proforma II collects data for multiple intelligences and consists of 80 items on a five-point Liker scale which is used to identify eight multiple intelligence abilities as defined by Gardner (2006), namely verbal linguistic, logical-mathematical, visual-spatial, musical-rhythmic, interpersonal, intrapersonal, bodily-kinesthetic, and naturalistic. Proforma III The questionnaire comprises 30 items, with each learning style (Visual, Auditory, Kinesthetic) represented by 10 items. Each item is rated on a five-point Likert scale, where respondents indicate their level ofagreement with each statement (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 =Agree, 5 = Strongly Agree).

Proforma I: General Characteristics and CEE score
Proforma II: Questionnaire based on Howard Gardner's MI models 12
Proforma III: VAK's Learning Styles Questionnaire13

Data was analyzed using descriptive statistics (Mean,Standard deviation and percentage) and inferential statistics (Spearmen Rank Correlation) test was used to measure correlation.

RESULTS
Out of 261 participants, majority (70.5%) of them were young adult; 78.9% were female. More than half (53.3%) were from Kathmandu valley. Almost one third (29.9%) of the participants were BSN students. More than three fourth (78.9%) were female.

Table 1: Multiple Intelligence of Students

Multiple intelligence	Minimum	Maximum	Mean	SD
Linguistic intelligence	0	10	4.9	1.7
Logical-mathematical intelligence	0	10	5.5	1.8
Spatial intelligence	1	10	4.9	1.8
Bodily-kinesthetic intelligence	2	10	6.0	1.8
Musical intelligence	0	10	4.7	2.1
Interpersonal intelligence	0	10	5.2	1.9
Intrapersonal intelligence	1	10	5.6	1.7
Naturalist intelligence	1	10	5.8	2.1

Table 1 depicts that the bodily-kinesthetic intelligence had highest mean score 6.0) followed by naturalist intelligence (5.8). However, the musical intelligence had lowest mean score (4.7) followed by spatial intelligence (4.9).
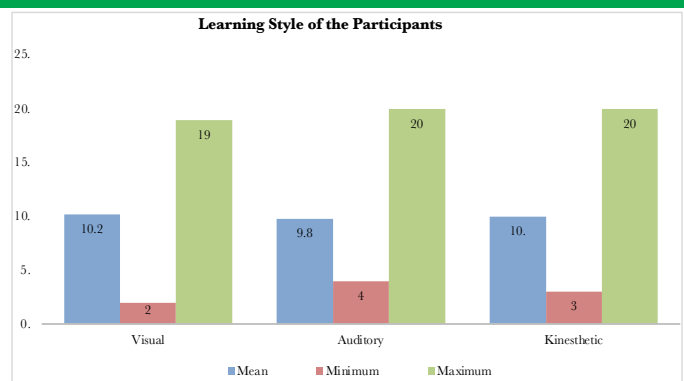

Fig 1: Learning Style of the Participants

Table 2: Correlation between Multiple Intelligence and Learning Styles of the Students

Multiple Intelligence	Learning Style		
	Visual	**Auditory**	**Kinesthetic**
Linguistic intelligence	-0.024 (p=0.697)	0.006 (p=0.929)	0.019 (p=0.760)
Logical-mathematical intelligence	-0.094 (p=0.130)	0.023 (p=0.707)	0.107 (p=0.195)
Spatial intelligence	0.079 (p=0.206)	-0.008 (p=0.897)	0.080 (p=0.085)
Bodily-kinesthetic intelligence	-0.043 (p=0.493)	-0.049 (p=0.428)	0.131 (p=0.035)
Musical intelligence	-0.123 (p=0.047)	0.083 (p=0.181)	0.050 (p=0.420)
Interpersonal intelligence	-0.163 (p=0.008)	0.106 (p=0.087)	0.069 (p=0.266)
Intrapersonal intelligence	-0.161 (p=0.009)	-0.049 (p=0.430)	0.213 (p=0.001)
Naturalist intelligence	-0.006 (p=0.928)	-0.040 (p=0.518)	0.052 (p=0.406)

(r): Spearman Ranked Correlation *Correlation is significant at the 0.05 level, **Correlation is significant at the 0.01 level (2-tailed)

Table 2 shows a weak positive correlation between bodily-kinesthetic intelligence and kinesthetic learning style (r = 0.107, P = 0.035). Musical intelligence had a weak negative correlation with visual learning style (r = -0.123, P = 0.047). Interpersonal intelligence (r = -0.163, P = 0.008) and intrapersonal intelligence (r = -0.161, P = 0.006) negatively correlated with visual learning style. Intrapersonal intelligence positively correlated with kinesthetic learning style (r = 0.213, P = 0.001).

Multiple Intelligence and Gender of the Participants
Female students had highest mean score on bodily-kinesthetic intelligence i.e. 6 and lowest mean score on linguistic and spatial and musical intelligence i.e. 4.9. Male participants had highest mean score on bodily kinesthetic intelligence (6.4) followed by naturalist intelligence (6.0). However, they had lowest mean score on musical intelligence (4.5).

Multiple Intelligence and Program of Study
The highest mean score on linguistic intelligence was of BNS students (5.6) and the lowest was of BSN students (4.4). In regard to logical mathematical intelligence, highest mean score was of BNS students i.e. 6.1 and the lowest was of BSc. Medical Lab Technology i.e. 5. The BNS students had highest mean score on spatial (5.2); bodily-kinesthetic (6.7); interpersonal (5.7) and naturalist intelligence (6.4). In regard to intrapersonal intelligence, BPH students had the highest mean score (6.1) and BSN students had the lowest (5.4).

Learning Style and Program of Study

Participants of Bachelor in Pharmacy had the highest mean score on visual learning i.e. 10.7 students followed by the BSN students (10.4). In regard to auditory learning style, the highest mean score was of Bachelor in Public Health students (10.3) followed by BSc. MLT (9.8). The highest mean score on kinesthetic learning style was of Bachelor in Pharmacy students i.e. 10.4 followed by BNS students (10.1).

Table 3: Correlation between Participants' Age and Multiple Intelligence

Multiple Intelligence	Age	
	Correlation	**P-value**
Linguistic intelligence	0.139*	*0.025*
Logical-mathematical intelligence	0.012	*0.850*
Spatial intelligence	0.043	*0.485*
Bodily-kinesthetic intelligence	0.151*	*0.015*
Musical intelligence	0.096	*0.121*
Interpersonal intelligence	0.239**	*0.000*
Intrapersonal intelligence	-0.003	*0.966*
Naturalist intelligence	0.212**	*0.001*

(r) Spearman Ranked Correlation, *Correlation is significant at the 0.05 level, **Correlation is significant at the 0.01 level (2-tailed)

Table 4 depicts that participants' age had positive correlation with their linguistic intelligence (r: 0.139, 0.025); bodily-kinesthetic intelligence (r: 0.151, P-0.015); interpersonal intelligence (r: 0.239, P-0.000) and naturalist intelligence (r: 0.212, P-0.001).

Correlation between Multiple Intelligence and Learning Styles of the Students according to Sex

In female participants, visual learning style had negative correlation (r: -0.152, P-0.30) with interpersonal intelligence, however, kinesthetic learning style had positive correlation with intrapersonal intelligence (r: 0.256, P-<0.000). Whereas in male participants, the spatial intelligence had negative correlation (r:-.266, P-0.050) with auditory learning style and intrapersonal intelligence had negative correlation (r: -289, P-0.032) with visual intelligence.

DISCUSSION

The study found that students had the highest scores in bodily-kinesthetic intelligence (6.0), followed by naturalist intelligence (5.8), while musical intelligence had the lowest score (4.7). In terms of learning styles, students preferred visual learning the most (10.2) and auditory learning the least (9.8). Among different student groups, Bachelor of Pharmacy students showed the highest mean scores for visual (10.7) and kinesthetic (10.4) learning styles, indicating a strong preference for visual aids and hands-on activities. These findings align with previous research, which suggests that students' intelligence types influence their preferred learning styles [10].

A weak positive relationship was found between bodily-kinesthetic intelligence and kinesthetic learning style. This means students who are good at physical activities also prefer learning through movement. Conversely, certain intelligences, such as musical, interpersonal, and intrapersonal, showed a weak negative correlation with visual learning. This suggests that students with these intelligences may not prefer visual learning methods [11].

Some studies support the idea that students learn better when their learning style matches their strongest intelligence. For example, students with high bodily-kinesthetic intelligence may benefit from physical activities, while those with strong visual intelligence may prefer diagrams and charts [12]. However, the strength of these relationships varies, and different studies have reported different results.

Not all research agrees on this connection. Some studies have found stronger links between multiple intelligences and learning styles, while others found little or no connection. This inconsistency could be due to differences in students' age, learning environment, or the methods used to measure intelligence and learning styles. For instance, a study found no significant relationship between multiple intelligences and learning styles among elementary students, suggesting that these connections may differ based on age and educational context 13.

More research is needed to fully understand how multiple intelligences and learning styles interact. Educators can use this knowledge to design lessons that meet different students' needs, helping them learn more effectively.

CONCLUSION

This study highlights the diversity in multiple intelligences and learning styles among health professional students. Bodily-kinesthetic intelligence scored highest, indicating a preference for hands-on activities, while musical intelligence scored lowest. Visual learning was the most preferred style, followed by kinesthetic and auditory. Positive correlations were found between bodily-kinesthetic intelligence and kinesthetic learning style, while negative correlations were observed between visual learning and musical, interpersonal, and intrapersonal intelligences.

RECOMMENDATIONS

Active Learning Strategies like simulation labs, role-playing, and other kinesthetic learning activities to engage students with high bodily-kinesthetic intelligence.Design classroom activities that cater to visual, auditory, and kinesthetic learners to ensure all students can benefit from the teaching methods used. And also incorporate a mix of lectures, group discussions, hands-on activities, and multimedia resources to cater to various learning styles. Longitudinal ,comparative and Interventional studies can be conducted to give more insight into multiple intelligence and learning style

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AUTHORS CONTRIBUTION
The first author involved in developing proposal, research tools, data collection, report writing and manuscript finalization whereas other authors contribute on concept, data editing and data analysis .

COMPETING INTERESTS
All the authors declare no competing interest