

Types of Intelligence and their Relationship with Gender and Career Choices among First-Year Undergraduate Students in Kenya

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Abstract

Training institutions all over the world place a high premium on those who excel in examinations. In Kenya, students who obtain a minimum grade of C+ in the Kenya Certificate of Secondary Education examination qualify to be admitted into undergraduate degree programmes. This has been an impediment for a majority of first-year students in choosing a career hence a substantial number of students end up revising their courses. This may lead to low career satisfaction levels. The study sought to establish types of intelligence among first-year undergraduate students across gender and career choice. The study was guided by the Multiple Intelligence Theory (1983). Ex-post facto design was adopted for the study. The study population was 490 BEd students and a sample of 220 students was drawn using stratified sampling. Data were collected using a questionnaire and interview schedule. The questionnaire was piloted using 10% of the study population. Test-retest reliability indicated the questionnaire was reliable ($r = 0.84$). Qualitative data were transcribed and emerging themes were reported. Further, data was analyzed using frequency counts and percentages. The study found interpersonal intelligence ($n=34$; 15.5%) to be the most dominant type among the respondents, followed by verbal linguistic intelligence ($n=32$, 14.5%). The least dominant was visual-spatial ($n=16$; 7.3%). Males dominated all types of intelligence except interpersonal and visual-linguistic. It was concluded that differences exist in specific types of intelligence across gender and career choice. The study recommends the findings for the student placement process, career guidance and further research.

Keywords: Intelligence, Gender, Career Choice, Undergraduate Students, Public University

Introduction

Academic result is the main tool that is used to promote learners at all levels of education in most parts of the world. Moreover, it is a means of placing students in broad superficial intelligent-quotient (IQ) based career training groups. Many academic universities are doing more teaching than career training by failing to recognize their students' vocational aspirations and laying more emphasis on students' intellectual

development (Shearer, 2006). Therefore, if the academic environment of a university is to reward certain patterns of students' abilities, students must be admitted into degree programmes that are compatible with their types of intelligence.

Gardner (1983) challenged the traditional theory that there is only a single intelligence. Yavich and Rotnitsky (2020) argued that Gardner does not deny the existence of IQ, but questions its importance outside a relatively narrow and limited school system. If a person failed an IQ test, then they would be deemed unintelligent by traditional theory standards. However, other factors that must be considered are the benefits to students learning, the cultural background of students, and how interesting and engaging the activities are (Marens, 2020).

Gardner broadened the concept of intelligence and formulated a unitary theory on types of intelligence called Multiple Intelligence (MI) (1983) theory which emphasizes "types of intelligence which are autonomous but interactive. It is a theory based on different types of intelligence namely linguistic/verbal, mathematical/logical, bodily/kinesthetic, musical, spatial/visual, naturalistic, interpersonal, intrapersonal, and existentialist". Each type of intelligence is made up of specific skills. A person may have all the multiple intelligences mentioned or some of them with varying degrees" (Alghazo et al., 2009; Ozgen et al., 2011). For example, Eid and Alizh (2004) assert that a person can have extraordinary linguistic intelligence but low musical intelligence. According to Passadino (2021), by incorporating Gardner's theory of multiple intelligence into any curriculum, educators can take advantage of their student's strongest intelligence and allow them to learn in a safe learning environment. Interestingly, these types of intelligence may have largely remained untapped by public university education and research and are probably widely unknown to most students.

Cooijmans (2013) asserted that "sex differences in mental abilities are caused by hormonal differences (estrogen/testosterone) balances which work partly prenatally and partly after puberty. Females are slightly better than males at straight forward arithmetic (not complex mathematics)" (p. 34). Further, Cooijman (2013) found that

males are better than females “in spatial ability, mental manipulation of figures in two or more dimensions”. The above studies are significant to this study because they revealed gender differences in limited types of intelligence. Cooijmans (2013) focused mainly on logical mathematical, linguistic, spatial and bodily-kinesthetic and no other significant MI profiles like intrapersonal and naturalistic.

Armstrong (2012) suggested that “the multiple domains of intellectual abilities have unique skills channelled to specific occupations”. Further vocational subjects like fine art, “theatre arts and related occupations have sometimes been denigrated because the spatial, kinesthetic and other intelligence needed in these areas have not been recognized” (Woods & Hampston, 2010). According to Lenaghan (as cited in Shiruffudin, 2010), the interpersonal intelligence type is characterized by teaching. Wambugu (2010) asserts that some information technology professionals pay a lot of attention to communication skills because they share their ideas visually and use flowcharts, blueprints, satellite images, and schematics. However, other students, choose a different career path because they lack insight about career choice that reflects their unique abilities (Green, 2010). In Nigeria, for instance, many youths are unsuited for their careers as they find themselves in jobs that do not satisfy their interests (Issa & Nwalo, 2008). In Kenya, Obora (2012) reported that many students choose careers that eventually lead them to employment opportunities that they are not interested in.

Statement of the Problem

Most students admitted into public universities world all over spend most of their university years seeking knowledge, and academic excellence for a career path defined by scholastic intelligence. Yet University life offers an environment that encourages students to explore their passions, talents and innate skills devoid of conventional wisdom. In Kenya, students who attain a minimum grade of C Plus (C+) in KCSE are admitted into available BEd programmes in public universities. Yet,

academic qualification, being the only considered factor in placement remains an impediment to 79.4% of students when making a career choice. There is a possibility that a student is placed in a programme he/she did not intend to pursue. Available data shows that about 96.1% of the students were not allocated courses of their choice and 85% of students were not studying degrees of their interests despite scoring. With limited self-knowledge and congruent career opportunities at the university, students end up in degree programmes which may not correlate with their innate intelligences hence the low (7%) career satisfaction levels. The BEd programmes offered at a public university may have a strong bearing on different types of intelligence and not every student admitted into these programmes fit in them. There is no documented evidence of intelligence assessment administered to students to inform their placement in a degree programme that suits their interests and unique abilities other than KCSE which assesses a narrow scholastic cognitive ability. Hence, there is a need for this study.

Theoretical Framework

This study employed Gardner's (1983) Multiple Intelligence (MI) Theory. The basic tenets of multiple intelligence theory include inclusive and personalized approach, human potential, abilities and strengths, self-awareness and self-esteem, problem-solving, product creation, culture sensitivity, learning style and unique aptitude set capabilities and competencies.

An inclusive and personalized approach refers to values with diverse strengths but interactive abilities. This approach helps individuals to recognize and develop a unique mix of intelligences regardless of whether they are aligning with traditional societal expectations. Human potential refers range of abilities not focusing on academic achievement. People have a unique blend of capabilities, skills and strengths to solve a problem, create a product or perform a function considered valuable in one or more cultures hence boosting self-awareness and esteem (Morgan, 2021).

Therefore, successful behaviour in an educational setting largely depends on dominant skills and abilities in a student and the corresponding activities in a university academic environment which motivates or promotes a learning style. Hence, a “student with multiple intelligence will seek an academic programme and courses congruent to his/her unique types” (Johnson, 2007, p.65). A combination of the intelligences in action is noticeable when combined in daily actions and real life (Bordei, 2018). For example, a musically intelligent student will pursue a course in horn music skills like playing musical instruments, singing, recognizing tonal patterns, remembering melodies, composing music and understanding the structure and rhythm of music. A bodily-kinesthetic intelligence student will pursue programmes such as physical education or fine arts whereas a student with logical-mathematical intelligence uses reason, logic, numbers, and experimentations in sciences, mathematics and problem-solving.

Therefore, students training to be mathematicians or physicists spend years sharpening their mathematical intelligence in a distinctive and logically relevant way. According to Kerka (2012), “young adults with visual-spatial intelligence skills may be fascinated with mazes, jigsaw puzzle buildings, reading, writing, understanding charts and graphs, a good sense of direction, sketching, painting, drawing, and creating visual metaphors and analogies, manipulating images, constructing, designing practical objects and interpreting visual images” (p. 13). Teacher-trainees and history students need 3-D modelling and visualization to recreate historic characters while geography, physics and chemistry teachers can make these subjects interesting when teaching concepts like gravitational force and pressure using 3-D animation (Kariuki, 2011).

Naturalist intelligence includes a love for nature, for example, university botanical gardens, and environment-friendly courses like geography, zoology, and botany. In a university academic environment, a student with existentialist and intrapersonal intelligences portrays understanding, and self-reasoning and knows

his/her role in a relationship with others. Such students also excel in courses like research, philosophy and psychology. Yazdanimoghaddam and Khoshroodi (2010) found that linguistic and musical intelligence are the two main predictors of teacher efficacy. Students training in BEd programmes are required to train in utilizing bodily-kinesthetic intelligence to build effective communication. According to Saeedi et al. (2012) a sitting or stationary teacher runs the risk of putting students to sleep as opposed to a teacher who makes the right body movements at the right time.

Types of Intelligence across Gender

Shahzada et al. (2011) investigated the Self-Perceived Multiple Intelligences of first-year male and female students in all government degree colleges during the 2010 session in the Bannu district. The study revealed that the mean score of the male self-perceived intrapersonal intelligence was mean=3.26 and female mean = 3.57. However, the study by Shahzada et al., (2011) did not examine gender differences in existential intelligence.

According to Cooijmans (2013) “sex differences in mental abilities are caused by hormonal differences (estrogen/testosterone) balances which work partly prenatally and partly after puberty” (p. 24). Females outscore males in perceptual speed with their advantage in such tasks as matching figures, clerical checking, speed and accuracy varying from .2 to .4 SD. Cooijman (2013) further found that “males are better than females in spatial ability, mental manipulation of figures in two or more dimensions”. The difference varies from .3 to .5 SD. Males are better in numerical ability at .1 to .25 SD. While in spatial ability there are huge differences favouring males.

Mahasneh (2013) conducted a study on the relationship between Multiple Intelligence and Self-efficacy among a sample of Hashemite university students to determine if there are significant differences in the use of multiple intelligence among the respondents when grouped according to sex and academic performances. Mean and standard deviations and t-tests were calculated, for example bodily-kinesthetic (males

2.49, SD, .62; females, mean 2.43 SD, .59 and logical-mathematical (males mean 2.40; SD .64; females mean 2.43, SD .54). The results portrayed no significant differences in the level of all sub-scales of the multiple intelligence between males and females. Mahasneh (2013) did not focus on other significant MI profiles like existentialist, intrapersonal and naturalistic which were examined by this study.

Mustafa et al. (2014) further investigated types of multiple intelligences among undergraduate Students at Yarmouk University in Light of Gardner's theory. Results attributed to the gender variable showed that there are no statistically significant differences ($p=0.05$) between the mean scores of the male and female respondents on intrapersonal intelligence while there are significant differences ($p= 0.05$) between the mean scores of the male and female respondents on the rest of the intelligences.

Types of Intelligence across Career Choice

Armstrong (2009) suggested that “the multiple domains of intellectual abilities have unique skills and occupational channels” (p. 11). A summary of the types of intelligence and sample congruent careers is given in Table 1.

Table 1: Types of Intelligence and Sample Congruent Careers

Types of Intelligence	Congruent Careers
Musical	Musician, disk jockey, composer, music teacher
Logical/ Mathematical	Accountant, researcher, mathematician, statistician,
Visual/ Spatial	Fine Artist, pilot, painter, designer
Bodily/ Kinesthetic	Athlete, choreographer, firefighter, artisan, P.E tutor
Verbal/Linguistic	Poet, journalist, writer, teacher, lawyer, translator
Intrapersonal	Researchers, theorists, philosophers, psychologists
Interpersonal	Salesperson, counselor, teacher, nurse, politician,
Naturalist	Biologist, farmer, botanist, meteorologist, veterinarian
Existentialist	Preacher, philosopher, star reader, astrologer

Source: Gardner, 2012 , <http://www.Ipride.net/learningstyles.mi.htm>

Green (2010) using a sample of twelve first-quarter fashion students investigated the perceptions of usefulness using MI theory to determine their career niche in the fashion industry. The researcher found that all the student participants were able to make a connection with their MI strengths. The study by Green (2010) was characterized by a small sample size among the demographically limited American population and did not address other types of intelligence like existentialist and naturalistic. Further, it focused on female fashion students only.

Ghazi et al. (2011) investigated the relationship between student's self-perceived multiple intelligences and academic achievement among 714 male and female first-year students enrolled in all government degree colleges in district Bannu in Pakistan. The study found a significant correlation between self-perceived verbal/linguistic ($r = .26$; p . value $= .00$ at 0.01 level), logical/mathematical ($r = .42$; p . value $= .00$ at 0.01 level) and students' academic achievement. However, an insignificant correlation was found between perceived musical intelligence and academic achievement ($r = .05$; p . value $= .14$ at 0.01 level) and a very weak correlation between bodily/kinesthetic intelligence and academic achievement. ($r = .12$; p . value $= .04$ at 0.01 level). The finding by Ghazi et al. (2011) is significant to the current study because entry and progress in the degree choice under investigation are determined by academic achievement in semester examinations.

Hanafiye (2013) further scrutinized whether there is a significant relationship between a particular type of intelligence and success in grammar, listening and writing. Results show that there is a low positive relationship between writing scores and musical intelligence ($r = .182$, $p < .033$). The analysis also indicated some negative correlations in the following intelligence: bodily-kinesthetic ($r = -.166$, $P < .049$), intrapersonal ($r = -.183$, $P < .031$), and spatial ($r = -.172$, $p < .042$) had low negative correlations with student's grammar test scores.

Yamin (2013) conducted a study to investigate the types of mathematical thinking and its relationship with some variables. The ratio of the students who chose the scientific stream was 35% while that of those who chose the humanities sciences was

65%. This study is significant to the present one as both studies sought to establish the dominant types of intelligence and less dominant types of intelligence across B.Ed. Programmes.

Karugu and Otiende (2012) surveyed BEd graduates of Kenyatta University (1985 -1995) who were teaching in various secondary schools in Kenya. The authors reported that respondents chose the following abilities and skills in order of importance as expected at the workplace: sense of responsibility; self-confidence; ability to solve problems and perform reliably and initiative. That study is similar to the current one because the abilities and skills identified during the survey constitute the subscales of different types of intelligence. This study further sought to align the abilities and skills surveyed by Karugu and Otiende (2012) to specific multiple intelligence profiles.

Research Methodology

An ex-post facto research design was adopted for this correlation study. In ex-post facto design, the researcher attempts to determine the relationship and not causation. Ex-post facto design was considered appropriate for this study because the independent variables under investigation especially the gender of respondents, types of intelligences and degree programs had already been determined and could not be manipulated (Orodho, 2012).

The study population included all 490 (289 males and 201 females) first-year undergraduate students at the School of Education during the 2016/2017 academic year. The females were 41.02% of the total student-accessible population and males were 58.98%.

First, a sample size of 220 BEd students was obtained using a formula developed by Israel (2013). In the event of cohorts with large samples obscuring the data representativeness smaller cohorts like BEd. Music with IT was treated within B Ed.-Arts with IT. For example, BEd-Music with IT sometimes registers as low as five

students. The programmes were lumped due to similarities in subjects offered, and activities within related course units.

Proportional stratified sampling was then used to ensure that students from the five cohorts under the School of Education were adequately represented in the sample in proportion to their number in the population hence maximizing the likelihood of representativeness. A simple stratified random sampling technique was then used to select respondents from each cohort.

This study employed a Student Questionnaire interview schedule and content analysis. The questionnaire was piloted using 10% of the study population. Test-retest reliability indicated that the questionnaire was reliable ($r=0.84$). The research instruments were also screened for content and language appropriateness by psychometric experts.

Qualitative data were transcribed and emerging themes were reported. The types of intelligence were subjected to the computation of descriptive statistics such as frequency counts and percentages. Similarly, types of intelligence across gender and career choice were established using frequency counts and percentages.

Results and Discussions

Types of Intelligence across Gender

Males dominated in all types of intelligence except interpersonal, verbal-linguistic and bodily-kinesthetic. Males recorded higher frequencies in logical-mathematical intelligence ($f = 18$; 30.2%). In naturalistic intelligence, males were dominant ($f = 18$; 30.2%) against females ($f=10$; 24.7%). However, both male and female respondents recorded equal frequencies in visual/spatial, existentialist and intrapersonal intelligence. The small difference in types of intelligence across genders may be due to small sample sizes in some of the B.Ed programmes e.g. B.Ed-French and B. Ed-ECDE.

Types of Intelligence across Career Choice

The results of the study showing the distribution of types of intelligence within the BEd programmes are presented in Table 2

Table 2: Distribution of Types of Intelligence across Career Choice

Types of Intelligence	BEd Arts		Bed Science		BEd SNE		Bed French		Bed ECDE		TOTAL	
	F	(%)	f	%	f	(%)	f	(%)	F	(%)	F	%
Interpersonal	18	15.1	6	10.3	5	26.3	2	16.7	3	25.0	34	15.5
Verbal –Linguistics	16	13.4	7	12.1	2	10.	5	41.7	2	16.7	32	14.5
Logical-Mathematical	10	8.4	15	25.9	2	10.5	1	8.3	2	16.7	30	13.6
Bodily –Kinesthetic	15	12.6	10	17.2	1	5.3	1	8.3	1	8.3	28	12.7
Naturalistic	12	10.1	15	25.9	1	5.	0	0.0	0.0	0.0	28	12.7
Music-Rhythmic	13	10.9	1	1.7	3	15.	1	8.3	2	16.7	20	9.1
Existentialist	13	10.9	1	1.70	2	10.5	0	0.0	0.0	-	16	7.3
Intrapersonal	12	10.1	1	1.7	1	5.3	2	16.7	0.0	-	16	7.3
Visual-Spatial	10	8.4	2	3.4	2	10.5	0	0	2	16.7	16	7.3
TOTAL												
	119	100	58	100	19	100	12	100	12	100	220	100

From Table 2, the most dominant types of intelligence across BEd programmes were interpersonal intelligence (f=34; 15.5%), followed by verbal-linguistic (f =32; 14.5%), followed by logical-mathematical (f=30; 13.6%). The least dominant were

existentialist and visual-spatial ($f=16$; 7.3%). More specifically, the BEd French and BEd-ECDE programmes had no naturalistic and existentialist types of intelligence. Similarly, the visual-spatial type of intelligence was not found in BEd French while intrapersonal was not found in the BEd –ECDE programme.

The most dominant type of intelligence in the BEd (Arts) programme was interpersonal intelligence ($f=18$; 15.1%). This was followed by verbal linguistics ($f=16$; 13.4%). The least type of intelligence among BEd (Arts) respondents were existentialist and visual-spatial ($f=10$; 8.4%). According to MIDAS Manual (2007), the other intelligence types like bodily–kinesthetic ($f=15$; 12.6%), musical-rhythmic ($f=13$; 10.9%) and existentialist ($f=13$; 10.9%) are considered moderate in terms of proportions in populations. However, the current study found them to be less dominant types of intelligence.

In BEd (Science), the least type of intelligence was the music/rhythmic, existentialist and intrapersonal ($f=1$; 1.7%) while logical-mathematical and naturalistic intelligence recorded the highest number of respondents ($f=15$; 25.9%). Results also show that in B. Ed (SNE), the dominant type of intelligence was interpersonal ($f=5$; 26.3%) followed by music-rhythmic ($n=3$; 15.8%). However, intrapersonal, bodily and naturalistic intelligence recorded the least number of respondents ($f=1$; 5.3%) within the BEd-SNE. Within the BEd French programme, the dominant type of intelligence was verbal-linguistic ($f=5$; 41.7%). However, naturalistic and visual-spatial types of intelligence were not found in the programme. Results further showed that BEd-ECDE had few cases across all types of intelligence.

These results are in agreement with the results of Mustafa et al. (2014) who reported differences between the types of intelligence in favour of science colleges and those in favour of humanities. Findings of the current study, however, differ from those of Matto et al. (2006) in which intrapersonal intelligence ranked highly (64.0%), while logical mathematic (8.0%) and spatial (7.8%) types of intelligence ranked low.

The themes that emerged from key informants attributed their dominant types of intelligence such as logical-mathematical, to science-based programmes. The programmes largely focused on scientific concepts, methodologies, activities and skills based on scientific evidence and experiments. However, the themes emerging from each programme should not be misinterpreted by the reader since the study was done with large groups, especially in the B. Ed Arts and B. Ed-Science and this may have obscured important individual and subgroup differences for groups with low enrolments like B. Ed-French and B. Ed-ECDE.

Conclusions and Recommendations

a) Types of Intelligence across Gender

Male and female students possess different types of intelligence with some favoring males and others favoring females. Males dominated in all types of intelligence except in interpersonal, verbal-linguistic and bodily-kinesthetic. However, both male and female respondents recorded equal frequencies in visual/spatial intelligence, existentialist intelligence and intrapersonal intelligence.

b) Types of Intelligence across Career Choices

The most dominant types of intelligence across BEd programmes were interpersonal intelligence followed by verbal-linguistic and then logical-mathematical in that order. The least dominant were existentialist, intrapersonal and visual-spatial. All the types of intelligence were distributed across all the B.Ed. Programmes except for naturalistic and existentialist. More specifically, the B.Ed. French and B.Ed.-ECDE programmes had no naturalistic and existentialist types of intelligence. Similarly, the visual-spatial type of intelligence was not found in B.Ed. French while intrapersonal was not found in B.Ed. –ECDE programme. The study concluded that the types of intelligence are reflected in the B.Ed. Programmes to nurture the unique abilities of students through strategies, activities, courses and development of competencies core to each specific programme.

The author recommends a large-scale comparative study involving public and private universities and more degree programmes in Kenya.

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