Algebraic Competences and Emotional Intelligence of First year Bachelor of Science Education Students at Copperbelt University in Zambia.

BY

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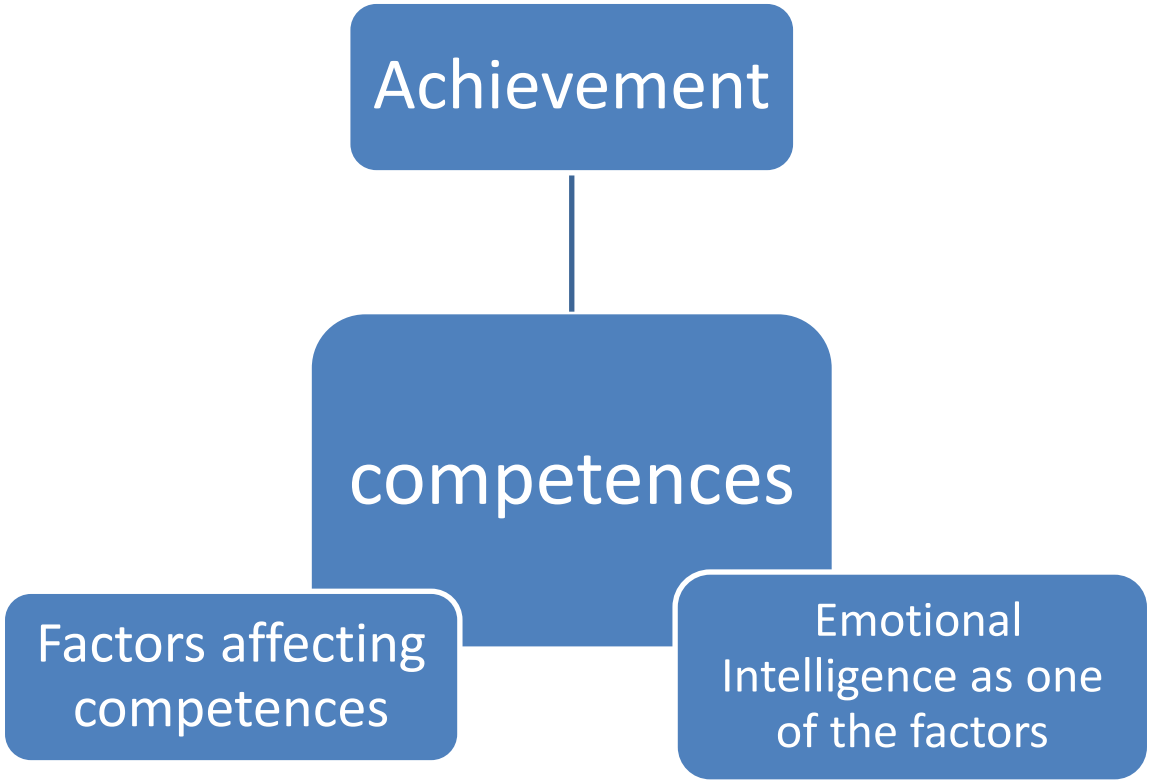
End of Stay Presentation

Background

- Every institution of learning is concerned with the academic achievement of its learners (Mishra, 2012).
- Institutions desire that their learners progress from one level to another.
- In many situations the above is not the case.
- Poor academic achievement may be due to lack of required competences which may also be due to other factors.

Competences and Emotional Intelligence



Competences

Competences: knowledge, understanding, skills and abilities
(Villa Sánchez and Poblete Ruiz, 2008) .

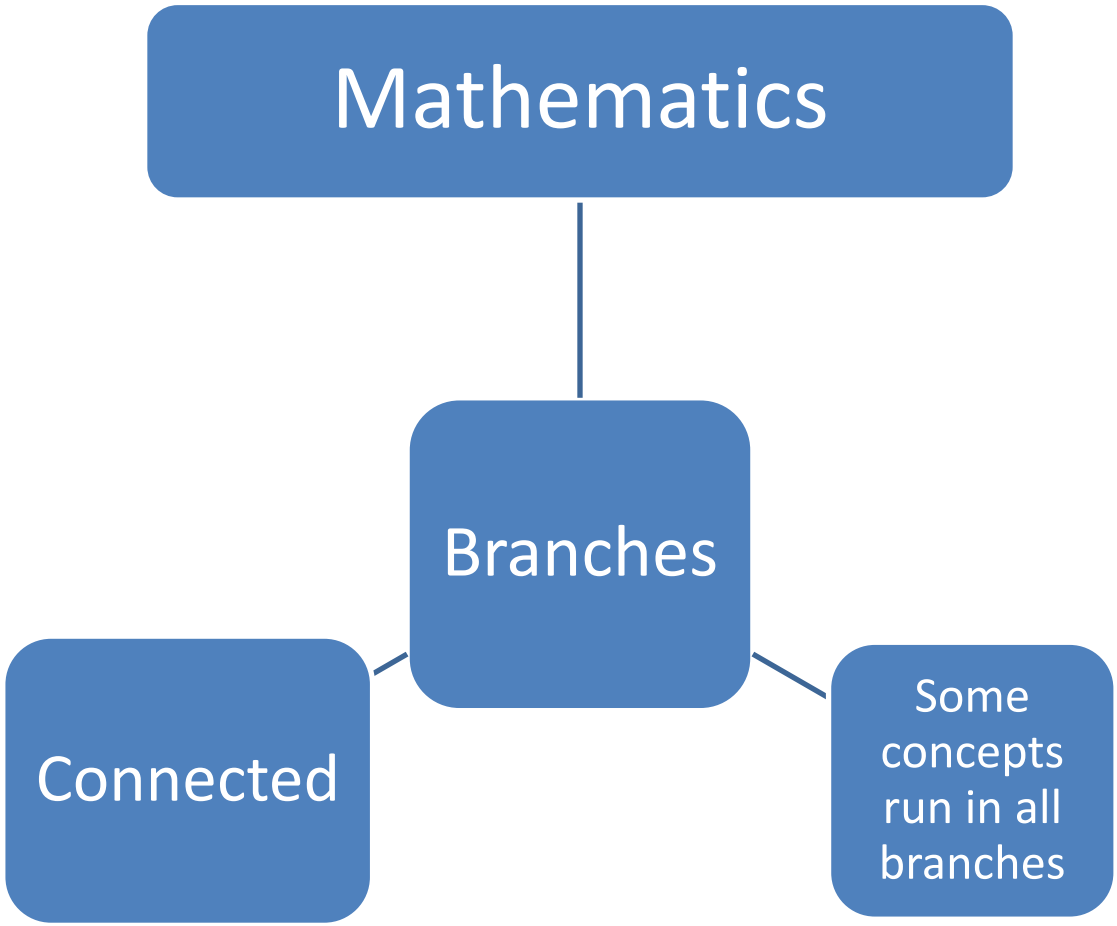
Competences: generic competences, subject specific competences.

Mathematics specific competences:

- Profound knowledge of “elementary” mathematics (such as may be covered in secondary education),
- Ability to extract qualitative information from quantitative data,
- Ability to formulate problems mathematically and in symbolic form so as to facilitate their analysis and solution

(González and Wagenaar, 2003)

Algebra Specific competences



Algebra in Trigonometry question

Given that $0^0 \leq \theta \leq 360^0$ find all the possible values of θ in the equation $cos^2\theta - 3sin\theta + 3 = 0$.

Solution

- Express $cos^2\theta$ and $sin\theta$ in $3sin\theta$ in similar terms.
- Identity $cos^2\theta + sin^2\,\theta = 1$,
- Subject of the formula $cos^2\theta = 1 - sin^2\,\theta$.
- Replace $cos^2\theta$ in $cos^2\theta - 3sin\theta + 3 = 0$ with $1 - sin^2\theta$
- Result like terms in $sin\theta$ giving us $1 - sin^2\theta - 3sin\theta + 3 = 0$.
- simplify and obtain $-sin^2\theta - 3sin\theta + 4 = 0$ or $sin^2\theta + 3sin\theta - 4 = 0$.
- Type of equations called quadratic equations. So we let $x = sin\theta$ so that $(sin\theta)^2 = sin^2\,\theta = x^2$.
- Express $sin^2\theta + 3sin\theta - 4 = 0$, in terms of x, that is $x^2 + 3x - 4 = 0$.
- Then solve by factorization as outlined below:

Algebra Specific competences (contd.)

$$x^2 + 3x - 4 = 0.$$
$$x^2 + 4x - x - 4 = 0.$$
$$x(x+4) - 1(x+4) = 0.$$
$$(x+4)(x-1) = 0$$
$$(x+4) = 0 \; or \; (x-1) = 0$$
$$x = -4 \text{ or } x = 1$$

But $x = sin\theta,$ then $sin\theta = -4$ or $sin\theta = 1$

We discard $sin\theta = -4$ since $-1 \leq sin\theta \leq 1$ and we remain with $sin\theta = 1$

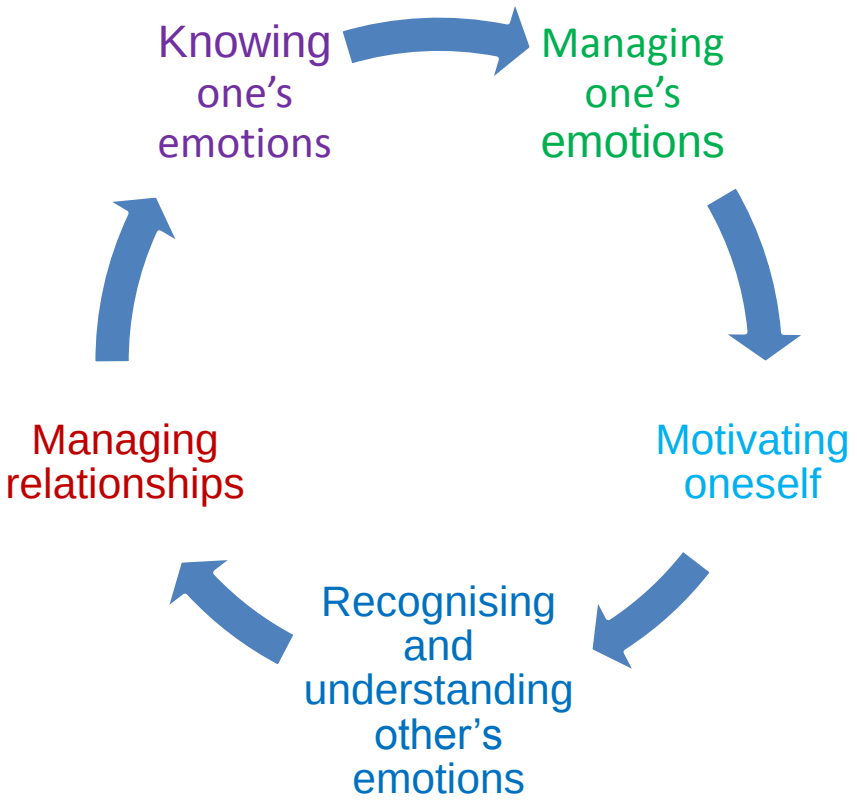
That is $sin\theta = 1$

$$\theta = \sin^{-1}(1)$$
$$\theta = 90^0$$

Algebra Specific competences and EI

- Algebraic competences; relationship to students' EI?
- Emotional Intelligence?

Goleman's Domains of EI



History and Theoretical Framework of EI

- 1920s Thorndike's "social intelligence" (Serrat, 2010).
- 1985 Wayne Leon Payne.
- In 1990, Peter Salovey and John Mayer: EI as coping with emotions
- in 1995 Goleman and the five domains, Schutte and others.

Measurement Tools for Emotional Intelligence

- Two ways to measure Emotional Intelligence Quotient (EQ): self-report questionnaires, performance.
- Many measurement tools;
- SSEIT for this study (Likert scale).
- SSEIT measures: expression of self's emotions, understanding of others emotions, regulation of emotions, and utilization of emotions.

Statement of the problem

- At the Copperbelt University in Zambia (CBU), mathematics compulsory to all first year undergraduates.
- Performance of Bachelor of Science education students in first year mathematics (MA 120) not good ($< 50\%$).
- Examiners' Reports for 2012, 2013, 2014 and 2015 indicate that 43%, 47%, 39% and 37% respectively of first year Bachelor of Science education students failed MA 120.
- students who fail go through academic difficulties: delayed to exclusion.
- Students' failure impacts negatively on stake holders.
- Why should students fail?

Purpose of the Study

- Examine the relationship between emotional intelligence and academic achievement in Algebra of first year Bachelor of Science mathematics and science education students at CBU in Zambia.

Research Questions:

- Grade 12 level Algebraic competences and First year university level Algebraic competences?
- Significant relationship: students' university algebra test scores and their emotional intelligence scores?
- Significant difference between male and female first year students in their emotional intelligence?

Significance of the Study

- CBU administration as a basis for including EI training for students.
- Lecturers of mathematics and others within CBU. Other lecturers from other universities.
- Bachelor of Science education students now and as teachers later.
- Other researchers and scholars.

Methodology and Research Procedure

Research Design: A correlational research design was employed

Research Instruments: SSEIT, Grade 12 level algebra test and the first year university level algebra test.

Reliability of Instruments: The SSEIT's reliability calculated using Cronbach's reliability test and Cronbach alpha was 0.793 (0.79) which showed good reliability of the SSEIT.

Algebra tests reliability: Parallel forms of reliability. Results r=0.889 (=0.9) for the Grade 12 level Algebra and r=0.859 (=0.9)

Participants

143 students from CBU selected; purposive sampling . 107 (25 females and 82 males) fully participated.

Findings and Discussion of Findings

First Research Question

Correlation: Grade 12 level Algebraic competences and the First year university level Algebraic competences as measured by the two tests?

Pearson‟s Product Moment Co-efficient of Correlation Method.

The co-efficient of correlation ($r = 0.665$ and $p = 0.00 < 0.01$), significant at the 0.01 level (2- tailed).

Findings and Discussion of Findings (contd.)

Second Research Question

Significant correlation: Students' university algebra test scores and their EI scores?

Pearson‟s Product Moment Co-efficient of Correlation Method.

(r= -0.145 and p=0.135>0.05), not significant at the 0.05 level (2- tailed).

Findings and Discussion of Findings (contd.)

Third Research Question

Significant difference between male and female first year students in their emotional intelligence?

Mean difference=5.168,

t = -3.584,

df =65.754,

significance level at 0.05 ($p=0.00 < 0.05$),

95% confidence interval,

difference between 2.497 and 7.838.

Conclusion and Recommendations

1. Fairly good correlation between the competences the students have at Grade 12 level and those they have in first year university Algebra.

2. Low achievement in first year university Algebra (and mathematics in general) at CBU can be attributed to other factors other than EI

3. There is a significant difference between male and female first year education students in their emotional intelligence as measured by the SSEIT. Some earlier studies have agreed with this finding. (Faisal, 2015;Yahaya &Hadid, 2015).

4. Need for both female and male students receive formal training in EI

5. Further research consider 3 or more universities so as to establish whether the results could be the same as this study.

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