Impact of Assessment on Motivation of Biology Senior Secondary School (2) Students in Ogba Egbema Ndoni L.G.A Rivers State

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Abstract

Learning and particularly assessment practices that encourage a self determined approach enhance feelings of well being and achievement motivation. Students in a first term biology senior secondary school two (11) unit, were the participants for an evaluation of the impact of assessment. The intrinsic motivation inventory was used to assess psychological reactions. A repeated measures comparison for each motivation variable was conducted using mixed model analysis interest/enjoyment and perceived competence were significantly lower in week 7 with Pressure/Tension being significantly higher when the most number of assessment items per student were due. For this group of students the demands of assessment have been shown to have a psychological impact.

Keywords: *Motivation, Assessment, Biology, Senior Secondary Two (2) Students*

Introduction

Teacher may not always fully enhance the individual potential of their students, with some activities inhibiting or distorting learning (Entwistly 2014). Assessment may be viewed as a mechanism by which a teacher finds out what the students have gained from learning activities. It helps the teacher to determine the extent the students are able to accomplish the tasks as stated in the learning objectives (An iodoh 2016). Also assessment may be described as the hidden curriculum, and has the possibility for detrimental effects on educational ideas as well as the capability of being a coercive process/Sambel et al 2012). Assessment may also modify the students' perceptions and behavior. Motivation refers to factors that direct and maintain behavior.

According to Entwistle (2014) and Newstead (2013) an intrinsically motivated individual is more likely to be involved in reflection and deep interaction with the knowledge, an approach that encourages both flexibility and transferability. This integrated approach is expressed through feelings of satisfaction, enjoyment, competence and a desire to persist with tasks. On the other hand, motivation that is extrinsic is more related to external influences such as rewards or punishments (Deci and Ryan 2012) and even of failure (Huffman 2009). A fear of failure

motivational style often drives a surface approach where there is a narrowing of the attentions to only those aspect that are goal oriented (Ryan et al 2010). Direction is articulated as a collection of self initiated demands expressed through feelings that depict a loss of autonomy and resultant pressure to conform. Pressure from perceived loss of autonomy reduces intrinsic motivation and self determination (Patrick & Leone 2011). Being externally motivated, this approach satisfies a need related to the learning. If motivation is shifting from intrinsic to extrinsic as the term progresses, then a concomitant effect on learning is possible towards a surface approach. (Briggs 2003).

The Biology Senior Secondary School Students report that they were not prepared for their academic experience and that they need skills and support to cope with the new demands that are placed upon them at the commencement of their higher education (Fazey & Fazey 2001), students deals that they possess the potential for autonomous and successful learning, however their perceptions indicate that they are not sure of their ability to fulfill this (Fazey & Fazey 2001). According to Abouseri (2013) there are differences in approach between individuals with the traits of self-esteem and achievement motivation being determinants of influence on approaches towards learning.

Motivation exists not only within the cognitive and behavioral domains but also within the affective, such as the level of investment and ensuring emotional reaction. Affective areas are measured by rating the students interest and emotional reactions for example, their desire to know more, and whether they are stimulated or excited by the learning (Briggs 2003). There is a paucity of information as to the changes in motivation as the first term in SS2 progresses and the influence of extra term assessment. Further focus on the situational factors is needed to fully understand the causal influences on the SS2 year experience. Therefore the aim of this investigation was to evaluate the nature of the affective response, in terms of motivation, to the demands of intra term assessment as the SS Biology students first term of study progressed.

Methodology

Participants:-

Participants (N=137) were SS one (1) Science Students studying across science pragrammes and enrolled in a common unit in the first term SS two (2) study year. All students signed an informed consent prior to commencement. To ensure confidentiality students randomly selected a 3 digit number from a closed box. This personal identifier was unknown to the researchers and was used by students to record their data for the duration of the research. Individual responses by the participants where at no point able to be identified. There was also no identification of individual nits, courses, unit assessors or tutors.

Measures

Assessment Tasks

Between week 1 and 3 of the term, the participants were asked to fill out a grid that depicted the weeks of the term and the number of assessment items that they were to complete during the terms that they were to complete during the term. The unit's culture was the source for this information. The data was then collapsed to the number of assessment tasks each week for each participant.

Intrinsic Motivation Inventory

Participants were asked to respond to the intrinsic motivation inventory (IMI) on a weekly basis for the duration of a self reporting experience conducted from weeks 2 through to week 14. The IMI instrument has been used in several investigations o intrinsic motivation (Plant & Ryan 2010). It consists of 22 items that combine into the subscales of interest/Enjoyment perceived choice, perceived competence and pressure/Tension (Ryan et al 2010). The items were worded to relate to perceptions of the SS one (1) science learning experience. These were rated on a weekly basis using a likert scale, (0 = not at all, 1= a little, 2= somewhat true, 3 = quite a bit and 4 = very true). Interest/ Enjoyment is an 'operational' indicator of intrinsic motivation (Ryan et al 2010). Whilst perceived choice and perceived predictors of behavioral measures of intrinsic motivation. Pressure/Tension is theorized to be a negative predictor of intrinsic motivation. The subscales have been found to be factor analytically coherent and stable across a variety of tasks and settings (Ryan 2010)

Appropriate items were reversed scored, with a higher score indicating more of the concept described in the item name. The subscales for interest/Enjoyment, perceived competence, perceived choice and pressure/Tension were then constructed for each participant using their appropriate items. Thus a higher score on pressured/Tension means that the participants felt more pressured and tense; a higher score on perceived competence means that the participant felt more competent.

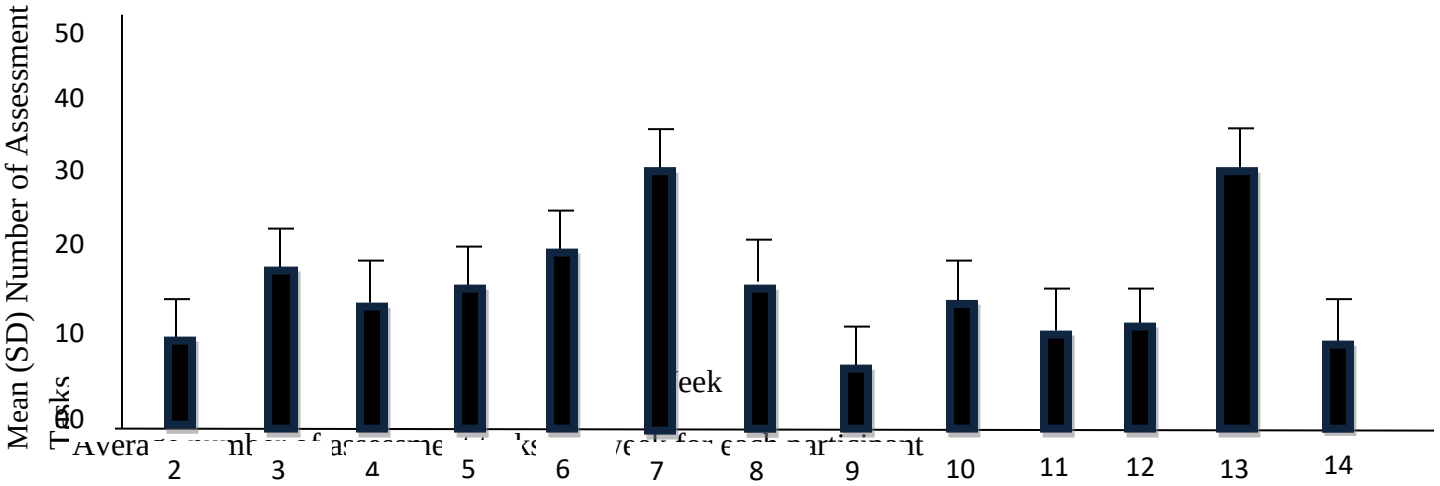
Statistical Analysis

A repeated measures comparison was used to investigate assessment Demand Variation over the term. The comparison for each motivation subscale was conducted using mixed model analysis adjusted for the number of tasks. Models for the repeated measures structure were investigated and an Autoregressive Heterogeneous variance chosen. The estimation method was Restricted Maximum likelihood. A bonferroni adjustment was used for multiple comparisons. Fixed effects include the number of tasks and the week. As not all students completed the motivation profile each week, the repeated effects included each occasion the student completed the motivation profile. Alpha was taken at $P<0.05$ (2 – tailed).

Results:

The response rate for questionnaires varied from week to week. Maximum and minimum response rate for the 14 weeks was 86.67% (week 7) and 51.85% (week 9) respectively, with the average response rate being 75.84 $\pm$ 10.39%.

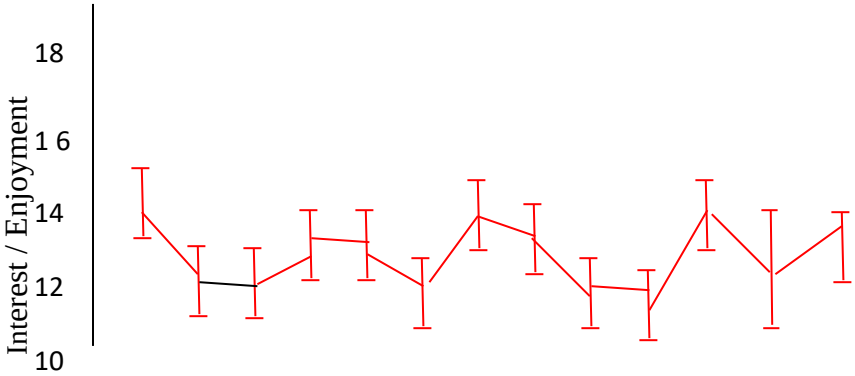
The assessment demand per student varied significantly from week to week ($F = 24.59$, $P<0.001$). Fig. 1 shows the average number of tasks per student per week. Week 7 shows the highest average number of assessments (2.82$\pm$ 0.75 tasks) and in describing order followed by week 13 (2.65 $\pm$ 1.06 tasks) and 12 (2.24 $\pm$ 0.75 tasks). Across the term the maximum number of tasks per week for each student varied between 2 and 6.



The repeated measures analysis of the IMI showed a significant effect over the semester for interest/Enjoyment (F = 2.97, P = 0.001), Perceived Competence (F = 3.31, P< 0.001), Perceived Choice (F= 3.62, P<0.001) and Pressure/Tension (F= 6.39, P<o.oo1) even when adjusted for the number of tasks.

Estimates of fixed effects showed Interest/Enjoyment to be significantly low in week 3, (+ = 300, p=0.003) week 4 (t= - 2.44, p=0.016 and week 7 (t= -2.24, P= 0.026). pair wise comparisons showed Interest /Enjoyment was significantly higher at week 2 compared to week 3 (P=0.003/ as in fig. 2) Perceived competence was significantly low in week 7 (t = -4.35, P=0.001) with pair wise comparisons showing a significant difference to week 2 (P = 0.011), week 6(P=0.047), week 13(P=0.046), and week 14(P=0.002) (as in fig. 2). Estimates of fixed effects showed Perceived Choice to be significantly high in the mid-term study week, week 9(t= -2.27, P=0.009) (fig. 2). Estimates of Fixed Effects showed Pressure/Tension to be significantly different to week 2.

(P= 0.001), week 3 (P = 0.011), week 5 (P<0.01), week 6(P <0.001), week 8 (P<0.001), week 9(P<0.001), week 10(P<0.001), week 12(P=0.002), week 13(P=0.010), and week 14(P=0.019) (as in fig. 2)



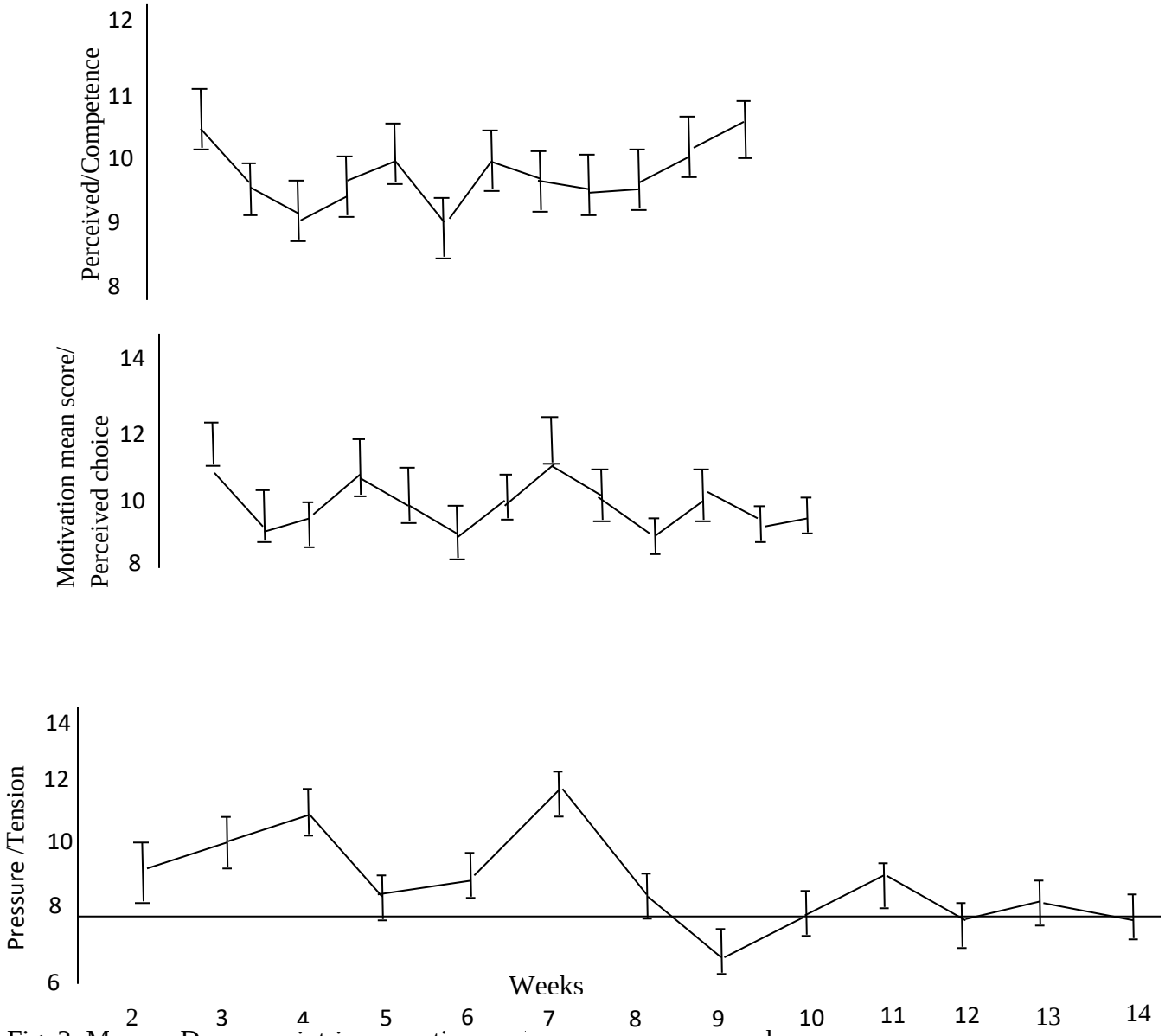


Fig. 2: Mean (SD) for the intrinsic Motivation Inventory Scores for the week 2-14

Discussion:

For the duration of the term, Biology students self reported about their intrinsic motivation. The variation of these psychological aspects over the semester was investigated taking into account the number of assessment tasks each week. Thus it has proved a unique opportunity to look at motivation within the higher education learning environment references about the effect on science learning can also be made, in particular the impact of assessment.

The perception of pressure/tension is a response to an awareness of a lack of autonomy (Patrick and Leone, 2011) with the thoughts likely to be the result of having to do something rather than

wanting to do it, an indicator of knowledge at certain times, not being accepted or owned by the individual (Peris, 2008). The results indicate that the science students were responding to the external influences, for example fear of consequence (Huffman, 2009) or just wanting to get through. The students must have perceived the learning environment as being controlling which is suggestive of extrinsic motivation (Breen and Linsay, 2010). Also the reduction in interest /Enjoyment seen at week 7, suggests a decrease in intrinsic motivation.

It is acknowledged that the student responses may also reflect multidimensional influences such as those related to finances, employment and general life interest, not just assessment. The concomitant decreases in interest/Enjoyment and perceived competence, with increase in pressure/Tension for week 7 supports the possibility that this was not an ideal learning environment at this time and hence there may have been impact on learning outcomes. Week 7 was also the week for the highest average number of assessments and therefore the impact of a poor learning environment in this week may have been reflected in the final grades. However the impact on final grades was not quantified.

Perceived competence reflects the perception of personal adequacy (Ryan and Deci, 2012). This subscale was reduced at week 7 as compared to a number of the other weeks in the first term. Feeling of competence is about knowing that they have adequate skills to cope with the tasks. Competence is a primary need and motivates behaviors (Frederick, 2003). Ideally, suitable challenging contexts designed for the pursuit of ability and ultimately the development of competence should be used in assessment.

Some of the assessments undertaken by these students may have elicited a more surface approach, such they encourage only a limited impact upon self confidence and beliefs about ability (Briggs, 2003) as they were being completed for the sake of it, rather than for any intrinsic value. It is also possible that the cluster of assessment at week 7 with no concurrent feedback or results also impacted on perceived competence until the results were known. Interestingly perceived competence was significantly increased by week 13 and 14 when the results from the cluster of assessments at week7 would have been known as students have a preference for engagement in the use of feedback (Murphy, 2004)

Conclusion

The investigation has focused on psychological indicators and motivation while considering the impact of intra term assessment. For a Biology SS2, first term cohort there was shift in towards extrinsic motivation at week 7. The learning environment at week 7 where there was a cluster of assessment tasks was therefore not ideal. Further understanding is needed to interpret the underlying factors. In addition the perceptions of students could be explored to further understand the quantity of individual assessments in terms of vocational relevance, personal mastery and choice would add to our understanding of what is best practice in assessment within secondary education.

References

Aniodoh H.C.O (2016) Modern Aspects of Integrated Science Education. *Hacofam Educational Books Nigeria pg 314 -315.*\

Entroistle N. (2014) Motivation and approaches to learning : *Motivation and conception of teaching in motivating students and staff Educational Development Association, Bamingham.*

Sambel K, and Mcdowell L. (2012) The construction of the Hidden curriculum: *Messages and meanings in the assessment of students learning Assessment and Evaluation in Higher Education Vol. 23 pp 391 -402.*

Briggs J.B (2003). Teaching for quality learning at University: *What the students does, 2nd edn. Buckmgham, UK.*

Ryan R, and Deci E. (2012) Intrinsic and extrinsic motivation: Classic definition and new directions; *Contemporary Educational psychology, Vol 25 pp 54 – 67.*

Ryan R, Connel J. and Plant R (2010) "*Emotions in nondirected text learning" and individual differences, Vol. 2 pp 1 – 17.*

Patrick, B, and Leone D (2011) Facilitating internalization: The self determination theory perspective" *Journal of personality; Vol. 62 pp 119 – 142*

Huffman K. (2009) Psychology in action. *Hoboken : Worth publishers*.

Fazey D. and Fazey J. (2001) The Potential for autonomy in learning perceptions of Ncompetence, *motivation and locus of control in SS two biology education Vol. 26.*

Peris F. (2008) The Gestalt approach and eye witness to therapy. *Ben Lamon: CA: Science and behavior books.*

Breen R and Lindsay R (2010) "Academic research and student motivation", *Studies in higher education, Vol. 24 pp 75 – 93.*

Fredrick R.C (2003) Competition and intrinsic motivation in physical activity: *A comparison of two groups; journal of sport behavior, Vol. 240.*

Murphy. R. (2004) Grades of Uncertainty. Reviewing the uses and misuses of examination results; *Association of teachers and lecturers. London.*