Impact Of Concept Based Activities (CBA) On Self-Concept Of Students In General Science At Elementary School Level

Noreen Ayaz[1] , Muhammad Saeed Khan[2]

[1]*PhD Research Scholar, Department of Education, The University of Haripur*
[2]*Associate Professor, Department of Education, The University of Haripur Saddaf Ayub, Associate Professor, Department of Education, The University of Haripur*

ABSTRACT

This study aimed whether the concept-based activities enhance the self-concepts of students in subject of general science at elementary level. Concept based activities (CBA) were used as a tool to improve self-concept among elementary level children in learning process of general science. A sample of 100 students from Government Girls Primary School Dingi and Government Boys Primary school Dingi were selected by using purposive sampling technique for school selection and stratified random sampling technique was applied to groups selection. On the basis of pre-test, two groups were formed one was designated as experimental and the other was as control group. The short version of Piers-Harris Scale (PHCSCS-2) scale was used as a tool to measure self-concept among young children of grade-5 level before and after treatment. The experimental group was taught through concept- based activities (CBA) for producing self-concept among themselves while the control group was taught traditional lecture method (TLM). After twelve weeks of teaching to both groups the researcher administered posttest to both groups The analysis of collected data was done by using mean scores, standard deviation and independent sample T-Test with Cohens D for effect of size to compare student's self-concept in both groups. The results showed a significant difference between scores in two groups. The concept-based activities (CBA) as independent variable was an effective practice for experimental group.

Keywords; Piers-Harris self-concept development scale (PHCSCS-2), Concept based activities (CBA), Self-Concept development, Experimental and Control group, Factorial Design

INTRODUCTION

Self-concept (SC) refers to knowledge and disposition of cognitive or descriptive component of one's self. Self-concept (SC) is defined as individual's perception about his or herself in relation to the surrounding environment for learning. The self-concept perceptions are the result of one's environment and are hence essential part of academic development. The multidimensional self-concept model for elaborating the idea has been used previously (Joshi & Srivastava, 2009; Marsh et al., 2004; Shavelson et al., 1976). The Self- Concept (SC) scale is divided in to several sub-domains and dimensions. It is a stronger determinant of internalizing symptom (Schwartz et al., 2012). Self-concept development leads mental health and perceptions made in learners minds. A significant study has examined that cause-and-effect relationships for self-concept development (Wu & Kuo, 2015). Various studies on self-concept (SC) also showed impact on mental health of students such as anxiety, physical appearance, behavior, popularity, happiness in certain learning tasks for their self-concept (SC) buildings in several areas of psychology and science (Veiga et al.,

2016). Concepts are mental categories for facts, objects, events, people, ideas, even skills and competencies that have a common set of features across multiple situations and contexts for learning science. Therefore, concept-based activities (CBA) in learning science education method are defined as large or wide picture, ideas and learning activities explained how to organize and categorize information in a systematic way. Similarly, traditional learning pattern or scale which concentrate on the ability to recall specific facts, concept-based activities (CBA) focus on understanding wider principles or ideas called by researcher's concepts that can later be applied to a variety of exact in several examples of general science subject. Concepts are ranging from simple to complex according to how easily researcher can be defined relationship of a teacher and student. Concept based activities (CBA) are implemented as top-up approach verses the bottom-up models used in more traditional learning ways for understanding ideas. While, traditional learning activities (TLA) left as a rote memorization of facts and figures in general science subject. Hence, concept-based activities and self-concept development also interlinked with each other in context of elementary level children in learning general science. Piers-Harris (PHCSCS-2) scale used for determining the psychometric qualities of children at grade 5th level (Piers & Herzberg, 2002) and developing self-concepts among students. Therefore, self-concept is shaped at elementary level children minds after their positive attitude building in their minds related to understanding self-concept in general science using concept-based activities at classroom level.

SELF-CONCEPT

The idea of self-concept had appeared in numerous articles in recent years. The concept had been created to represent an evaluation of competencies and feelings of self-worth (Pajares & Schunk, 2005). Hence, it was considered to be the sum of total views that person had of himself and consist of beliefs, evaluations and behavioral tendencies

(Strangor, et al., 2022). Harter and others noted the way very young children start to be able to discriminate between themselves (Harter ,1996, 1999, Eggen & Kauchak, 2001; Harter& Bukowski,2015).

In one sense, self-concept was a person's attitude towards themselves, a reflection of how they saw themselves in some area of life: a combination of total of perceptions about oneself. Self-concept in an educational setting could be seen as how persons saw themselves in the context of learning. Therefore, the various researchers saw self-concept a set of attributes, characteristics, qualities and deficiencies, capabilities, relationships and values that learners desire: their perceived distinctiveness in the context of learning (Sanchez & Roda, 2007). Researcher noted the multi-dimensional nature of self-concept (John, 2000)

This multi-dimensional nature was both a strength but also a major problem when looking at self-concept. Humans were highly complex with a rich array of self-concepts and it was impossible to reduce this to a 'score' or even a small number of 'scores. This made any attempt at measurement extremely difficult. Therefore, various researchers described that some of the diversity of approaches that had been adopted to describe self-concept in the context of learning (Burns, 1982; Eggen & Kauchak, 2007). Many researchers (Burns, 1982; Shavelson & Bolus, 1981; Hatti & Marsh,1996; Mercer, 2011) had seen the multidimensional and multifaceted nature of self-concept, even in one area of life.

To make a matter even more complexed, the term 'self-concept' often overlapped and interrelated with other terminologies, such as self-esteem, self-worth, self-efficacy, self-beliefs, self-perceptions, subjective competence identity (Boekaerts, 1991; Burns, 1982; Byrne, 1996; Eccles & Wigfield, 1993; Hattie, 1992; Silverthorne et al., 2010; Wylie, 1974, 1979). Therefore, it was considered that self-beliefs, self-esteem and self-picture were all parts and components of self-concept (Burns, 1982). Overall, there was little

agreement across various authors and the idea of self-concept could be interpreted in numerous ways. One way forward was to considered self-concept in the context of learning in terms of two components: How a person sees them self; How a person evaluated them self (Vitro, 1971; Burns, 1982; Eggen & Kauchak, 2007).

The first was purely descriptive while the latter brings in elements of evaluation in terms of how the person sees them self in terms of coping with and gaining possible success in the learning context. However, self-concept was visualized, it was neither simple nor it was unidimensional (Schierer & Kraut, 1999). Hence, it was argued that self-concept was a context-dependent and multi-dimensional learned behavior pattern, which reflects on an individual's assessment of past behaviors that might influence an individual's existing behaviors and potential future behaviors (Bracken, 1996). Nonetheless, the picture was confused, with unidimensional and multi-dimensional aspects all being emphasized, with little clear agreement (Baumeister et al., 2006, Byrine, 2001; Hattie & Marsh, 1996; Marsh & Craven, 2006).

In history of self-concept, the brilliant insights of Katz in the context of attitudes might offer potentially useful insights about why self-concepts develop (Katz,1960). In his detailed analyses, Katz saw that attitudes develop in humans in order to help them to make sense of themselves, their world, and relationships. Perhaps, it was possible to saw that academic self-concept as a set of attitudes towards oneself in the context of learning, these attitudes enabling the person to make more sense of themselves in learning situations. Therefore, it was noted that the potential differences of academic self-confidence between high achievers and low achievers, between those encouraged to understand and those encouraged to memorize (Rosenberg, 1989).

Many of the articles published considered self-concept at a much wider level than simply looking at academic self-concept. This involves the individual's perception about his/her body or self-image consisting of the body shape, emotions and actions. Close family members and home environment were extremely important in a person's assessment of self-image. During interpersonal interaction, diverse social roles were performed by individuals that help to develop social self-concept. Negative and positive emotions, reactions and interests as well as spiritual self-concept might all be involved (Epstein, 1998, 1983, 2016).

The key point to noted was that self-concept in this widest sense involves cognition (what I knew of myself), emotion (how I feel about myself) and the behavioral (my past actions as well as how other react towards me). In all this, self-concept was related tightly to self-esteem. In this analysis, the parallels with attitude were very marked. Self-concept might be seen as attitudes towards self. This provides way to conceptualize academic self-concept:

> **Academic self-concept might be seen as attitudes towards self in the context of learning**

It had to be noted that one's appraisal of oneself might very well not be accurate. Some might be

over-confident and their self-concept might be too high, not reflecting reality. Others might lack confidence and their self-concept might be too low, not reflecting reality. This, of courses might make assessment of self-concept difficult if it relies in any way upon self-report.

There were other factors that might undermine positive self-concept. The development of self-concept would inevitably be influenced by any experience of internal and socio-emotional conflicts at each stage of development. Some might be put down by others persistently and positive views of self might be badly affected (Rogers et al., 1977). Hence, others might saw themselves as the would like to become in future (Adler, 1963; Adler & Radin, 2014).

Wider societal issues might also be important. The social context of any individual generates standards, values and beliefs and these might affect how any individual sees them self (Harter, 1999; Rosenberg, 1989). Cooley notes the powerful effect of the healthy home, school and societal environment (Cooley, 1902, 2017). Emotionally stable individuals tend had high self-esteem and sense of worth and they were affected less by the opinions of others (Harre, 1986). This could be described in terms of personal security and this often allows an individual to go beyond what either they or others might expect of them. In the development of positive self-concept, the place of those important to the individual (like family and friends) was powerful. Thus, the view of peers and other societal members becomes extremely influential in shaping self-description, perception and evaluation (Erikson, 1968, 1979, 2013; Marica, 1995).

There were probably two major factors in determining the direction of development. The first relates to the influences of important people in the individual's life. Thus, the way parents, siblings and friends treat an individual all tend to encourage the development of positive self-concept or otherwise. The second related to life experiences. Experiences of bad mistakes, successes or failures could all had a major impact on the development of positive

self-concept or otherwise. Indeed, these life experiences would have an ongoing influenced through life (McConnel & Strain, 2007).

There were many discussions about the way others could influenced the development of positive self-concept (Shavelson et al., 1976, 1982; Marsh et al., 2004; Marsh & Craven, 2006; Marsh, et al.,2010, Veiga, 2012,2016). In the context of learning, how the individual learner sees him/herself was a very important factor in learning success (Shavelson al., 1976). The learners needed to believe that they could succeeded and that success was a goal worth seeking in order to made the effort worthwhile. In all this, the highly multi-dimensional nature of academic self-context was a major issue (Craven & Marsh, 2008; Marsh & Craven, 2006, Veiga, 2012). Nonetheless, the self-concept of the learner would influence the way learning was approached (Veiga, 2012; Veiga & Domingues, 2012). Therefore, the self-concept creates self-confidence among children to solve their psychological problems and this element produce self-confidence among elementary level children to understand certain subject and their minds builds up to creates ideas. Hence, for understanding ideas in cognitive development of students, the concept-based activities (CBA), in subject of general science builds ideas in their minds to understand this subject scientifically and self-concept created self-concept buildings in their concept clearance and they left rote memorization

SELF-CONCEPT, BELIEF AND ATTITUDE

It had to be admitted that self-concept was an invented idea and was highly multi-dimensional in nature. Academic self-concept could be seen in terms of how persons saw themselves in the context of learning. However, this would still be highly multi-dimensional. How these ideas were related to the well-established ideas of beliefs, perceptions and attitudes was now explored. In the work of Oraif (2007), there was a most helpful analysis and was discussed (Reid & Ali, 2020). Oraif
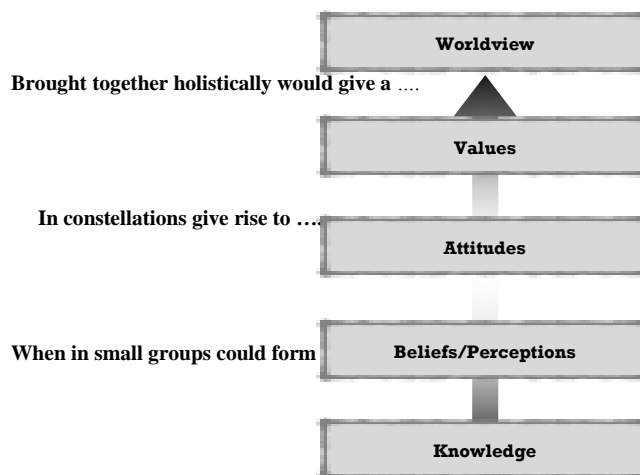
(2007) linked five levels together (figure 1.1).

Figure 1 From knowledge to worldview

Belief or perceptions involved an evaluation of something or someone. Combinations of beliefs constituted an attitude. If we considered self-concept, this could be considered as an attitude to oneself. Here, we were thinking of academic self-concept and this could be seen as an attitude to oneself in the context of learning. Beliefs or perceptions were numerous and groups of these could generated an attitude. In the same, self-belief could be seen as an attitude and was made up of numerous self-perceptions or beliefs about self, in the context of learning. If this analysis was valid, then the enormous research relating to beliefs and attitudes was highly relevant. This was particularly true in relation to measurement.

Academic self-concept was highly multivariate, being made up of numerous self-beliefs for learning certain subjects. Thus, any attempt to develop measurement to give some kind of score (or a smallest of scores) contradicted the multivariate nature of self-concept. Self-concept was a latent variable (or a set of latent variables). They cannot be measured directly but must be inferred from behaviour. It was possible to observed the behaviour of learner's while being involved in a period of learning. Gross trends and patterns might be observable. However, this would be a slow and tedious process of extended observation and might or might not provide an accurate picture. A common way forward was to employed questionnaires in that large amounts of data could be gathered relatively quickly. However, there were issues to be addressed. The evidence showed that respondents do answer the item with honesty and consistency (Reid, 2003). Therefore, were the respondents able to saw themselves as they really were, especially with younger learners. There was considerable evidenced that they were unable to do so. (Reid & Ali, 2020). Nonetheless, with large numbers, the overall patterns of responses might provide an accurate picture.

The greater problem lies in analyzing the data obtained from the questionnaire/MCQS. Data from all questionnaires were ordinal in nature and must be handled using non-parametric statistics. When questionnaire data were analyzed by inappropriate statistics, the net outcome was usually a loss of detail although gross trends might be apparent (Reid, 2003, 2006, 2015). Let us imagine a questionnaire with, say, 10 items. were all these 10 items measuring the same variable. If only one variable was involved, inter-item correlation would provide evidence (however, this must be conducted using Kendall's tau-b correlation, not Pearson correlation). A more powerful technique was to employ some form

of factor analysis.

Factor analysis was a statistical technique which reveals how many factors were needed to explain a set of item-item corrections. If only one variable was being measured by our 10 items, then only one factor would be founded. Most commercial questionnaires had been extensively tested using factor analysis. In the case of self-concept, this was revealed a small set of factors: the questionnaire was measuring a set of variables. However, there were still dangers in this approach (Reid, 2003, 2006; Ried & Mubeen, 2014).

MEASUREMENT OF SELF- CONCEPT

The Piers-Harris Self-Concept Scale (PHCSCS) in its various versions (Piers & Harris, 1964; Piers, 1984; Piers & Herzberg, 2002) had been employed in many different studies and had been to refer to in many other studies, especially in educational psychology, clinical psychology and psychological development. It had been employed in relation to general science and other science subjects.

Its use was widespread (Holmbeck et al., 2008; Oriel et al., 2008; Piers & Herzberg; 2002; Remine et al., 2009) and its psychometric properties well documented. It appeared to be valid across different social and cultural settings (Flahive et al., 2011; Flahvine et al., 2015; Piers, 1984; Piers & Harris, 1964; Veiga, 2012), including with learners from specific populations including those with various kinds of special needs (Piers & Herzberg, 2002). The Piers-Harris scale-III (Third Edition) was recently used to measured self-concept in children and young children (Piers et al., 2018).

Outcomes had been related to other variables such as extracurricular variables by Flahvine et al. (2015), the observation of the psychosociological environment of the classroom, school disruption and academic success by Veiga (2012), disturbing behaviors, sociability motivation and study methods , the self-concept development towards reading, the construction of citizenship projects, eating behavior related to self-concept development

scale by Piers and Herzberg (2002), and fatness and self-concept development in science subjects by Diana (2011). School readiness comprised factors related to level of self-concept, that was included on popularity, intellect in class, freedom of popularity, feeling of happiness and gratification as well as physical appearance and characteristics. The purpose of this study was to analyzed the relationship between the level index of body mass and self-concept development of students at primary level (Piers & Herzberg, 2009).

The questionnaire employed dichotomous scale responses (Veiga & Domingues, 2012). In this study, it seemed more appropriate to extend this to responses on a six-point scale, thus giving, potentially, enhanced discrimination. It was also decided to go for the use of each item in only one dimension of the scale, considering the factorial saturation and apparent validity and content of the item. This gives a short version of the scale, with established reliability and validity, in order to explore how students at elementary level develop in terms of self-confidence arising from new ways in presenting the science curriculum. This study aimed to build on the suggestion made in previous investigations (Veiga & Leite, 2016; Veiga & Domingues, 2012), improving the psychometric qualities of the Piers-Harris (PHCSCS) scale and, subsequently, the possibilities of gathering information that was more consistent with the theoretical foundation for self-concept building in general science. The goal was to relate the development of self-concept and link this to academic achievement both in terms of knowledge retention as well as conceptual understandings using concept -based activities (CBA) along with retention rates buildings self-confidence among themselves (students not being allowed continue on with studies in the sciences but repeating the year or course).

The version developed in this study involved 30 items of the modern Piers-Harris (PHCSCS-2) scale, changing the type of response from dichotomous (yes or no) to response 1 (completely disagree) to 6

(completely agree). The existence of a similar number of items for factors (5 in each factor) promotes the clarity of the evaluation and reduced the response time. The external validity had been demonstrated by Leite. Previous studies had shown that the scale had good psychometric qualities, the most important of these being validity. The present study also showed that Piers-Harris scale (PHCSCS-2) create self-confidence among elementary level children using concept-based activities (CBA) for concept building to experimental group as compared to control group taught through traditional lecture method (TLM).

RESEARCH QUESTION

According to the purpose of the study described in introductory section, the research question addressed is listed below;

Do concept-based activities enhance the self-concepts of students in subject of general science at elementary level?

RESEARCH METHODOLOGY

The study was experimental in nature, factorial 2x2 design was used at two levels with two groups, both of which were formed by random assignment (Lodico & Voegtle, 2010) based on literature review (Creswell, 2014). The one variable was method and the other variable was gender (use of concept-based method for experimental group and there is no use of concept-based method for control group)

To conduct the experiment two government girls'/boys' schools were selected in addition,50 boys and 50 girls selected for both groups from two schools. The total sample divided in to four strata, for example from 107 population 100 sample chosen For Experimental Group (n = 25) boys and (n = 25) girls' students where students were engaged through concept-based activities for measuring the effectiveness of Piers- Haris scale (PHCSCS-2) reflection among students, the control group was also consisting of (n = 25)

boys and (n = 25) girls in which traditional techniques were applied for effectiveness measurement of self -concept attainment in subject of general science. The outliers were removed from the study (Muijs, 2004). The selected students were divided into two groups (1) experimental group (2) control group. Each group composed of 50 students. The content validity was established by using expert judgmental procedures. Reliability of Piers-Harris scale (PHCSCS-2) was determined using Cronbach Alpha. It was lies between 0.6 to 0.8.

PROCEDURE

An experiment was conducted at Government Girls Primary School Dingi and Government Boys Primary school Dingi Haripur.107 students were enrolled in both boys' and girls' primary schools. The 7 outliers were removed. The 50 male and 50 female in both schools were chosen in subject of general science. Binary groups were formed consisted of 50 male and 50 females taken to conduct the experiment, further consisted of 25 pairs (25 Boys and 25 Girls) for experimental group, same repetition was applied on control group also consisted of 25 pairs (25 Boys and 25 Girls) Appropriate agenda was achieved for both groups. The self-concept development scale was based on PHCSCS-2(PIERS-HARRIS) scale. To check self-concept development of students PHCSCS-2 scale was applied for both groups before and after treatment (Piers-Harris & Herzberg, 2002) and the recent research study showed the structure and construction of Adolescent self-concept short scale Adolescents (ASCSS) (Veiga & Domingues, 2012) used for Portuguese adolescent students and this short scale was used for children of grade 5 level in recent study PHCSCS-2 consisted of 30 items for self-concept development of students as initial and final treatment. This scale was again used and adopted form adolescent's self-concept buildings (Veiga et al., 2016). For self-concept development, Piers-Harris (PHCSCS-2) scale

was used consisted of 30 items was applied in present research study. Suitable changes were made in classroom for teaching to both groups (experimental/ control) before and after treatment after expert's consultation of doctoral committee of UOH (University of Haripur).

DATA COLLECTION

The data was collected by researcher through research instrument using Piers-Harris scale (PHCSCS-2) before and after treatment. The data was in the form of students'30 items/statements. The data was collected from experimental and control groups students by researcher and experts' teachers.

DATA ANALYSIS

Data analysis was done by using descriptive statistics like mean score, standard deviation, and inferential statistics like, paired sample t-test, use for calculation and the effect of size measured by Cohen's D formula was applied.

RESULTS

$H_{01:}$ there is no significant difference between mean self-concept development Piers-Harris scale (PHCSCS-2) scores of boy's students experimental group taught through concept-based activities (TTCBA) and the boys of control group, not taught through concept-based activities (NTTCBA) in general science before treatment

Table 1 Comparison of boys PHCSCS-2 mean scores TTCBA and NTTCBA before treatment

Groups	N	Mean	SD Score	SE Mean	t-value	Sig.	Effect Size
TTCBA	25	69.20	16.95	3.39	0.191	0.84	-0.054
NTTCBA	25	70.24	13.92	2.78			

Not significant

Table 1 demonstrated the contrast comparison of TTCBA (N=25, Mean, 69.20, SD Score=16.95, SE Mean=3.39 and NTTCBA (N=25, Mean= 70.24, SD Score,13.92, SE Mean, 2.78. The hypothesis tested on their t-value= (0.191) and p value (0.84) which is greater than the significant value (0.05) (p=0.84 > (0.05) with weak effect of size (-0.054) and therefore, statistically found not significant. Hence, it is demonstrated that PHCSCS-2 of both groups are almost same in terms of their mean value and no flyer case found in this respect. As a result, failed to reject the null hypothesis.

$H_{02:}$ there is no significant difference between mean self-concept development, Piers-Haris scale (PHCSCS-2) scores of the girls' students in experimental group taught through concept-based activities (TTCBA) and the girls of control group, not taught through concept-based activities (NTTCBA) in general science before treatment;

Table 2 Comparison of girls PHCSCS-2 mean scores TTCBA and NTTCBA after treatment

Groups	N	Mean	SD Score	SE Mean	t-value	Sig.	Effect Size
TTCBA	25	68.08	16.81	3.36	-0.176	0.86	0.052
NTTCBA	25	67.76	9.56	1.91			

Not significant at 0.05 level

Table 2 demonstrated the contrast TTCBA (N=25, Mean, 16.81, SE Mean=3.36, and NTTCBA (N=67.76, SD =9.56, SE Mean=1.91) with (t-value= - 0.176) and (p value=0.86) both groups are non-significant because the p value is greater than the significant value (0.05) (p=0.86) > (0.05). The mean value of PHCSCS-2 Scale are equivalent of both groups with weak effect of size (0.052). Therefore, statistically found non- significant. As per result, the TTCBA (Taught through

concept- based activities) Score of both groups are approximately same before treatment in term of mean value and no flyer cases found in this regard. In conclusion, failed to reject the null hypothesis

$H_{03:}$ there is no significant difference between mean self-concept

development Piers-Harris scale (PHCSCS-2) scores of girl's students of experimental group taught through concept-based activities (TTCBA) and the girls of control group, not taught through concept-based activities (NTTCBA) in general science after treatment;

Table 3 Comparison of girls of Piers-Harris scale score (PHCSCS-2) after treatment

Groups	N	Mean	SD Score	SE Mean	t-value	Sig.	Effect Size
TTCBA	25	96.68	8.29	1.65	.194	0.00	1.790
NTTCBA	25	81.68	12.82	2.56			

significant at 0.05 level

The result of independent sample t-test in table 4.1.3 characterized that TTCBA (N=25, Mean= 96.68 SD Score =8.29, SE Mean=1.65 which is greater than NTTCBA (N= 25, Mean=81.68, SD Score=12.82, SE Mean= 2.56) denoted by t-value (0.194) and p -value (0.00) of both groups' hypothesis tested by p-value (0.00) which is less than (0.05) level (p=0.00 < (0.05). Therefore, the researcher rejected the null hypothesis. Thus, it was ensured that TTCBA (taught through concept-based activities) to girls have attained more

proficiency and gained ability with greater effect of size (1.790) than NTTCBA (not taught through concept-based activities) in PHCSCS-2 Scale inadequate period of time.

$H_{04:}$ there is no significant difference between mean self-concept development Piers-Harris (PHCSCS-2) scale scores of the boy students of experimental group taught through concept-based activities (TTCBA) and the boys of control group, not taught through concept-based activities (NTTCBA) in general science after treatment;

Table 4 Comparison of boys Piers-Harris scale (PHCSCS-2) score after treatment

Groups	N	Mean	SD Score	SE Mean	t-value	Sig.	Effect Size
TTCBA	24	95.25	9 .51	1.94	4.36	0.00	1.250
NTTCBA	26	81.708	12.11	2.37			

Significant at 0.05 level

The hypothesis established based on judgement among TTCBA and NTTCBA with (not taught through concept based activities) score which is presented in table 4.1.4.Independent sample t-test resulting the outcomes of TTCBA (taught through concept-based activities)(N=24, Mean= 95.25, SD Score=9.51,SE Mean=1.94) and NTTCBA (N=26, Mean= 81.708, SD Score=12.11, SE Mean= 2.37.The accomplishment of TTCBA mean score was higher with great effect of size (1.250) from NTTCBA and inferences found significant with t- value(4.36) and p value(0.00)

which is less than (0.05) (p=0.00 < 0.05).Consequently, the researcher rejected the null hypothesis.TTCBA(Taught through concept- based activities) of experimental group of boys has greater increased after intervention as compared to NTTCBA(not taught through concept- based activities) control group of boys.

Hence, it could be inferred that the performance score of experimental group in posttest is significantly better than that of control group score in General Science after treatment.

CONCLUSIONS

The performance of both boys and girls experimental (TTCBA) and control groups (NTTCBA) in pretest were not statistically different for self-concept development scores measured using PHCSCS-2 Scale. Hence, it means both groups before treatment were equally matched through stratified random sampling technique for experimentation. However, in posttest the performance of both boys and girls experimental (TTCBA) was much better than control groups (NTTCBA). Hence, inferred that for self-concept development increased confidence in students and enhance their learning skills. In present era science teacher must adopt concept-based activities (CBA) for building self-confidence among students at class room level and this strategy must be helpful for learners at elementary level and furthermore, Piers-Harris scale (PHCSCS-2) is helpful for checking their psychometric qualities in learning science and their self- concept buildings.

REFERENCES;

1. Adler, A., & Radin, P. (2014). Practice and theory of individual psychology. Routledge.

2. Adler, A. (1963). Practice and theory of individual psychology The Paterson, NJ. Littlefield, Adam

3. Byrne, B. M. (1996). Measuring self-concept across the life span: Issues and instrumentation. American Psychological Association. https://doi.org/10.1037/10197-000

4. Bracken, B., A. (1996). Clinical applications of a context-dependent, Multidimensional model of self-concept. A handbook of self-concept developmental, social, and clinical considerations. New York: John Wiley and Sons.

5. Baumeister, R. F., Gailliot, M., DeWall, C. N., & Oaten, M. (2006). self-regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. Journal of Personality, 74(6), 1773–1802. https://doi.org/10.1111/j.1467-6494.2006.00428.x

6. Boekaerts, M. (1991). Subjective competence, appraisals and self-assessment. Learning and Instruction, 1(1), 1–17. https://doi.org/10.1016/0959-4752(91)90016-2

7. Byrines, J. (2001). Minds, brains, and education: Understanding the psychological and educational relevance of neuro-scientific research. New York. Guilford.

8. Burns, R. B. (1982). Self-concept development and education. Cassell.

9. Cooley, C. H. (2017). Human nature and the social order. Routledge

10. Cooley, C. H. (1902). Human nature and the social order. New York. Scribner.

11. Creswell, J. (2014). Research Design. SAGE Publications.

12. Creswell, J., W. (2014). Qualitative, Quantitive &Mixed Method Approaches. Experimental and true experimental research design Sage Publications. NC. (4th Edition).

13. Diana, J. (2011). Psychosocial correlates of healthy beliefs, choices and behaviors in overweight and obese school age children. A Primary Health Care, Choices, Intervention, Pilot Study,26, 456-464. DOI: http://doi org/10.1016/j.pedn.2011.7.001

14. Eggen, P., D. Kauchak, D., P., & Garry, S. (2007). Educational Psychology: Windows on classrooms .200-222. Pearson/Merrill/Prentice Hall.

15. Erikson, E.H. (1968). Youth: Identity and Crisis. New York: W.W. Norton & Co.

16. Erickson, G. L. (1979). Children's conceptions of heat and temperature. Science Education, 63(2), 221–230.

https://doi.org/10.1002/sce.373063021 0

17. Erikson, L. (2013). Concept-Based Teaching and Learning. EMIS. Collation Concept .

18. Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. Annual Review of Psychology, 53(1), 109–132. https://doi.org/10.1146/annurev.psych. 53.100901.135153

19. Epstein, R. (2016). The Empty Brain: Your brain does not process information and it is not a computer. Aeon Essays.

20. Epstein, S. (1983). The unconscious, the preconscious, and the self-concept. Psychological perspectives on the self, 2, 219-247.

21. Epstein, S. (1998). Cognitive-experiential self-theory: A dual-process personality theory with implications for diagnosis and psychotherapy. In Empirical perspectives on the psychoanalytic unconscious. (pp. 99–140). American Psychological Association. https://doi.org/10.1037/10256-004

22. Flahive, M. W., Chuang, Y.-C., & Li, C.-M. (2011). Reliability and validity evidence of the chinese Piers-Harris children's self-concept scale scores among Taiwanese children. Journal of Psychoeducational Assessment, 29(3), 273–285. https://doi.org/10.1177/073428291038 0191

23. Flahive, M. W.,Chuang, Y.C., & Li, C.M. (2015). The multimedia Piers-Harris children's self-concept scale 2: Its psychometric properties, equivalence with the paper-and pencil version, and respondent preferences. PLOS ONE, 10(8), e0135386. https://doi.org/10.1371/journal.pone.0 135386

24. Hattie, J., A. (1992). Self-concept. Hillsdale. NJ. Lawrence Erlbaum Associates.

25. Holmbeck, G., N. Thill, A., W. Bachanas, P., Garber, J., Miller, K., B. Abad, M., Bruno, E., F. Carter, J., S. David-Ferdon, C., Jandasek, B., Mennuti-Washburn, J., E. O'Mahar, K., & Zukerman, J. (2008). Evidence-based assessment in pediatric psychology: Measures of psychosocial adjustment and psychopathology. Journal of Pediatric Psychology, 33(9), 958–980. https://doi.org/10.1093/jpepsy/jsm059

26. Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and level of voice in adolescents. In Social Motivation. Cambridge University Press. 11–42. https://doi.org/10.1017/CBO97805115 71190.004

27. Harter, S. (1999). The construction of the self. A developmental perspective. New York: Guilford Press. Cambridge, UK Cambridge University Press.

28. Harter, S., & Bukowski, W. (2015). The construction of the self. The Guilford Press.

29. Hattie, J. & Marsh, H.W. (1996). Future directions in self-concept research. In B. A. Bracken (Ed.). Handbook of Self-Concept .421-462. New York.

30. Hattie, J., & Marsh, H.W. (1996). Future Directions in Self-Concept Research. Bracken Handbook of self-concept. New York. John Wiley.421-462

31. Harre, R. (1986). An outline of the social constructionist viewpoint. The social construction of emotions. Oxford. England.2-14.

32. Joshi, S., & Srivastava, R. (2009). Self-esteem and Academic Achievement of Adolescents. Journal of the Indian Academy of Applied Psychology.

33. Katz. D., (1960). The Functional Approach to the Study of Attitudes. Attitude Change. Oxford University Press . American Association For Public Opinion Research,24, (2),163-204. https://www.jstor.org/stable/2746402

34. Lodico, G., M. & Voegtle , H. K. (2010). Designing with more than one independent or dependent variable. Methods in Education Research from Theory to Practice. (2nd Edition). USA.306-307

35. Mercer, H. (2011). Almost halfway there: An Analysis of the Open Access Behaviors of Academic Librarians. College & Research Libraries, 72(5), 443–453. https://doi.org/10.5860/crl-167

36. Marcia, J. E. (1995). The empirical study of ego identity. In H. A. Bosma, T. L. G. Graafsma, H. D. Grotevant, & D. J. de Levita (Eds.), (pp.67-80) Identity and development: An Interdisciplinary Approach. Thousand Oaks. CA. Sage.

37. Marsh, H., W. & Craven, R. G. (2006). Reciprocal Effects of Self-Concept and Performance from a Multidimensional Perspective: Beyond Seductive Pleasure and Unidimensional Perspectives. Perspectives on Psychological Science, 1(2), 133–163. https://doi.org/10.1111/j.1745-6916.2006.00010.x

38. Marsh, H., W. Parada, R., H. & Ayotte, V. (2004). A Multidimensional Perspective of Relations Between Self-Concept (Self-Description Questionnaire II) and Adolescent Mental Health (Youth Self-Report). Psychological Assessment, 16(1), 27–41. https://doi.org/10.1037/1040-3590.16.1.27

39. Marsh, H., W. Martin, A., J. & Jackson, S. (2010). Introducing a Short Version of the Physical Self-Description Questionnaire: New Strategies, Short-Form Evaluative Criteria, and Applications of Factor Analyses. Journal of Sport and Exercise Psychology, 32(4), 438–482. https://doi.org/10.1123/jsep.32.4.438

40. McConnell, A., R. & Strain, L. M. (2007). Content and structure of the self. The Self in Social Psychology. New York, NY: Psychology Press.51-72.

41. Muijs, D. (2004). Probability and statistical significance. Doing Quantitive Research in Education with SPSS. Sage publications. London. Thousand Oaks. New Delhi.75-76.

42. Oraif, F. A. (2007). An Exploration of confidence related to formal learning in Saudi Arabia (Doctoral dissertation, University of Glasgow).

43. Oriel, K., George, C. & Blatt, P. (2008). The impact of a community-based exercise program in children and adolescents with disabilities. A Pilot studies. Physical Disabilities. Education and Related Services, 27 (1), 5-20. (EJ807723).

44. Piers, E. & Herzberg, D. (2002). Piers-Harris Children's self-concept scale (2ª Edition.). Wilshire boulevard. CA. Western psychological service

45. Piers, E. V. (1984). Manual for the Piers-Harris children's self-concept scale (The Way I Feel About Myself) (rev). Tennessee: Counselor Recording and Tests.

46. Piers, E. V. (1984). Piers-Harris children's self-concept scale. Los Angeles: Western Psychological Services.95-121.

47. Piers, E., V. & Harris, D. B. (1964). Age and other correlates of self-concept in children. Journal of Educational Psychology, 55(2), 91–95. https://doi.org/10.1037/h0044453

48. Piers, E., V.Shemmassian,S., K. Herzberg,D. S. & Harris,D., B. (2018).Piers-Harris self-concept scale111(3rd -Edition).Los-Angeles, CA. Westren Psychology

Services.Behaviour - Assessement.http//www.wpspublish.com/app/Home-apex.

49. Piers, E., V. Harris, D., B. Herzberg, D. S. (2009). Piers-Harris children's self-concept scale – Piers-Harris 2. (5th edition). Los Angeles. Western psychological services.

50. Pajares, F., & Schunk, D. (2005). Self-efficacy and self-concept beliefs. New Frontiers for Self-Research, March H. Craven R, Mc Inerney D (eds.). Greenwich, CT. IAP. 95–121

51. Rosenberg, M. (1986). Self-concept from middle childhood through adolescence. Psychological perspectives on the self, 3,3 182-205

52. Rogers, T., B. Kuiper, N., A. & Kirker, W. S. (1999). Self-reference and the encoding of personal information., 35,677-688

53. Reid, N. & Amanat Ali, A. (2020). Beliefs and attitudes. 253–279. https://doi.org/10.1007/978-3-030-53677-0_11

54. Reid, N. (2003). Getting started in pedagogical research in the physical sciences. LTSN Physical sciences Centre.

55. Reid, N. & Mubeen, S. (2014). The measurement of motivation with science students. European Journal of Educational Research. 3, (3), 129-144

56. Reid, N. (2006). Thoughts on attitude measurement. Research in Science & Technological Education, 24(1), 3-27.

57. Reid, N. (2015). Attitude research in science education. Attitude Measurements in Science Education: Classic and Contemporary Approaches. 3-44.

58. Remine, M., D. Care, E., & Grbic, M. (2009). Deafness, teacher-of-the-deaf support and self-concept in Australian deaf students. Deafness & Education International, 11(3), 116-131

59. Stangor, C, Jhangiani,R. Tarry, H. (2022). The cognitive self. self-concept. (3rd Chapter). Principles of Social Psychology – 1st International H5P Edition Open Educational Resources. Hewlett Foundation.https://hewlett.org/strategy/open-educational-resources/.

60. Sanchez, F., J. & Roda, M., D. (2007). Relationship between self-concept and academic achievement in primary students. Almeria- Spain. 97.131.

61. Silverthorne, N., Dubois, D., L. & Crombie, G. (2005). Self-perceptions of ability and achievement across the high school transition: investigation of a state—trait model. The Journal of Experimental Education, 73(3), 191-218.

62. Shavelson, R., J. & Bolus, R. (1982). Self-concept: The interplay of theory and methods. Journal of educational Psychology, 74(1),3-17.

63. Shavelson, R., J. Hubner, J., J. & Stanton, G., C. (1976). Self-concept: Validation of construct interpretations. Review of educational research, 46(3), 407-441.

64. Schwartz, S., J. Klimstra, T., A. Luyckx, K., Hale, W., W. & Meeus, W. H. J. (2012). Characterizing the self-system over time in adolescence: Internal structure and associations with internalizing symptoms. Journal of Youth and Adolescence, 41(9), 1208–1225. https://doi.org/10.1007/s10964-012-9751-1

65. Scheirer, M., A. & Kraut, R. E. (1979). Increasing educational achievement via self-concept change. Review of Educational Research, 49(1), 131-149.

66. John, D. (2000). Self-concept. Retrieved from http://www.cbt.wiu.edu/John_Drea/self_concept. Html.

67. Vitro, T., F. (1971). The Self- concept in education. New York. Mss educational publishing comp inc

68. Veiga, F., & Leite, A. (2016). Adolescents' self-concept short scale:

A version of PHCSCS. Procedia - Social and Behavioral Sciences, 217, 631–637. https://doi.org/10.1016/j.sbspro.2016.02.079

69. Veiga, F., H. & Domingues, D. (2012). An Escala Piers-Harris Children's self-concept Scale. ISPA. Lisboa. 223-238.

70. Wylie, R. C. (1979). The self-concept: Theory and Research on Selected Topics. (2). U of Nebraska Press.

71. Wylie, R. C. (1974). The self-concept: Theory and Research on Selected Topics. (2). U of Nebraska Press.

72. Wu, P. C., & Kuo, S. T. (2015). Academic achievement, self-concept and depression in Taiwanese children: Moderated Mediation Effect. School Psychology International, 36(1), 36-53.