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Dear Readers!

Greetings from the members of Editorial Board

In the rapidly evolving landscape of education, one term stands out above the rest: Artificial Intelligence (AI). Indeed, AI has become a ubiquitous presence, permeating every facet of society and fundamentally altering the way we interact with technology. From business to healthcare, from administration to scientific innovation, AI has asserted its influence and reshaped the way we approach various domains. However, nowhere is its impact more profound than in the realm of education.

The integration of AI, particularly in the form of humanoid robots, into educational settings has sparked considerable interest and debate. These humanoid robots, equipped with advanced AI capabilities, are being deployed in classrooms worldwide, promising to revolutionize the learning experience. Indeed, research indicates that the implementation of educational robotics, especially in preschools and primary schools, holds immense promise for enhancing learning outcomes across a diverse array of subjects.

For instance, studies such as those conducted by So and Lee shed light on the positive impact of humanoid robots like NAO in facilitating learning, particularly in subjects like Mathematics. These findings underscore the potential of AI-driven technologies to engage students and foster a conducive learning environment. Moreover, the utilization of humanoid robots as lecturers at the university level, as demonstrated by Xu et al., has garnered positive feedback, indicating students' receptiveness to this innovative approach.

However, amidst the excitement surrounding the integration of AI in education, crucial questions emerge. Can humanoid teachers effectively nurture the psycho-social development of students? Do they possess the capacity for emotional interaction necessary for fostering holistic growth? Can AI truly supersede human intelligence in the classroom setting?

While studies suggest that humanoid tutors can enhance learners' motivation and enthusiasm, it is essential to acknowledge the limitations inherent in these technologies. Humanoids, despite their advanced AI capabilities, lack the nuanced thinking and emotional depth of human educators. As Macmurray(2012) aptly noted, the goal of education is not merely to impart knowledge but to cultivate individuals who embody empathy, compassion, and humanity.

In this issue of RRE, we explore the multifaceted implications of AI in education, alongside discussions on inclusive education and other pertinent topics. As we navigate this era of technological advancement, it is imperative to strike a balance between innovation and human connection. While AI undoubtedly holds immense potential to augment educational practices, let us remain steadfast in our commitment to nurturing the human spirit and fostering inclusive learning environments.

We invite our readers to engage in reflective discourse and share their insights on the evolving landscape of education. Your feedback is invaluable as we strive to facilitate meaningful dialogue and contribute to the growth of our journal.

With Regards
Editorial Board

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CONSTRUCTION AND VALIDATION OF CRYSTALLISED INTELLIGENCE QUESTIONNAIRE FOR TEACHER EDUCATORS

Research Paper

ABSTRACT

The aim of the study was to construct and validate a tool to measure the Crystallised Intelligence of the teacher educators. The questionnaire consists of multiple choice questions with four responses and three dimensions namely Academic Knowledge (Philosophy, Psychology, Technology and Pedagogy), Vocabulary & Reasoning and GK. The final tool consisted of 34 items. Item analysis was done with item difficulty and discriminating power. The validity of the questionnaire was established through content validity and the reliability was found as 0.845.

Keywords: *Construction, Validation, Crystallised Intelligence Questionnaire, Teacher Educators.*

Introduction

Intelligence is the aggregate of an individual's capacity to act purposefully, to think rationally, and to deal effectively with his/her environment. It is a form of mental or cognitive abilities, available with an individual which enables him to handle the environment in terms of adaptation to face novel situations as effectively as possible. The concepts of fluid and crystallized intelligence were originally identified and introduced by Raymond Cattell. Fluid intelligence is the capacity to reason and solve novel problems, independent of any knowledge from the past. But, crystallized intelligence is the store of specific information, knowledge, skills and strategies that one has acquired through experience and education. It is basically the acquired knowledge. Fluid intelligence and crystallized intelligence are discrete factors of general intelligence. Most of the IQ tests attempt to measure both varieties of intelligence.

Objective of the study

The objective of the study was to construct and validate the Crystallised Intelligence Questionnaire for Teacher Educators.

Construction of crystallized intelligence questionnaire

The investigator referred to a number of books, articles, chapters and web resources related to Crystallised Intelligence but found very little literature and thus realized the need for the construction of a tool for Crystallised Intelligence. After direct consultation with research supervisor and experts, the investigator fixed three dimensions namely Academic Knowledge, Vocabulary & Reasoning and General Knowledge. Discussions with the research supervisor and experts were helpful for the investigator in the designing of the questionnaire as multiple choice questions and refining of the tool. The draft tool consists of 51 items.

a) Pilot Study

After the construction of the first draft of the Crystallised Intelligence Questionnaire, the investigators decided to administer the tool. The tool with 51 items was administered to 45 teacher educators, who were selected randomly from Mar Chrysostom College of Education, Kirathoor, Bethlahem College of Education, Karungal in Kanyakumari District and St. Johns College of Education, Palayamkottai in Tirunelveli district. The teacher educators were requested to choose their responses by circling the right response from the four responses given in each item. The responses of the questionnaire were collected and scored as 1 for right answer and 0 for the wrong answer. The scores obtained by each respondent were tabulated and preceded for item analysis.

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b) Item Analysis

The total score of the Crystallised Intelligence Questionnaire ranges between 09 and 39 out of 51. Based on the scores two groups namely upper 27% and lower 27% were formed and the item difficulty and discriminating power were calculated. Items with item difficulty level between 20% and 80% and also with the discriminating power 0.2 and above were considered as valid items and they were retained and the remaining items were detained. So as per the item analysis, 17 items were removed from the tool. Thus, the final draft of the Crystallised Intelligence Questionnaire consisted of 34 items. The item analysis for CIQ was given below.

Table 1
Crystallised Intelligence Questionnaire – Item Analysis Results

Items	Item Difficulty	Discriminating power	Remarks	Items	Item Difficulty	Discriminating power	Remarks
Item1	21	0.25	Selected	Item27	58	0	Detained
Item2	21	-0.08	Detained	Item28	67	0.5	Selected
Item3	67	0.67	Selected	Item29	67	0.33	Selected
Item4	25	0.33	Selected	Item30	54	0.08	Detained
Item5	17	-0.17	Detained	Item31	38	0.42	Selected
Item6	58	0.5	Selected	Item32	25	0.17	Detained
Item7	63	0.75	Selected	Item33	54	0.08	Detained
Item8	29	0.25	Selected	Item34	38	-0.08	Detained
Item9	29	0.58	Selected	Item35	33	0.33	Selected
Item10	38	-0.08	Detained	Item36	54	0.75	Selected
Item11	29	0.25	Selected	Item37	58	0.33	Selected
Item12	33	0.17	Detained	Item38	63	0.42	Selected
Item13	33	0.5	Selected	Item39	63	0.42	Selected
Item14	42	0.17	Detained	Item40	67	0.5	Selected
Item15	33	0	Detained	Item41	71	0.58	Selected
Item16	63	-0.08	Detained	Item42	58	0.5	Selected
Item17	42	0	Detained	Item43	50	0.67	Selected
Item18	54	0.42	Selected	Item44	46	0.42	Selected
Item19	25	0.33	Selected	Item45	50	0.67	Selected
Item20	33	0.67	Selected	Item46	50	0.67	Selected
Item21	33	0.17	Detained	Item47	46	0.42	Selected
Item22	42	0.17	Detained	Item48	58	0.67	Selected
Item23	67	0.67	Selected	Item49	33	0.5	Selected
Item24	42	0.33	Selected	Item50	38	0.25	Selected
Item25	25	0	Detained	Item51	50	0.17	Detained
Item26	21	0.25	Selected	-	-	-	-

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c) Establishing the Validity

The validity of a tool has been established through different techniques. For the Crystallised Intelligence Questionnaire, the investigator established validity using the techniques of content validity. The procedure adopted for the establishment of validity are discussed below.

Content Validity

To establish the content validity, the questionnaire was given to three experts namely Thomas Alexander, Principal, St. Xavier's College of Education (Autonomous), Palayamkottai, Indra Mary Ezhilselvi, Assistant Professor of Psychology, St. Ignatius College of College of Education (Autonomous), Palayamkottai and Deepa, Assistant Professor of Education, NVKSD College of Education, Attoor. The correction, modification, reframing, rewording and rephrasing were done accordingly as per the valuable suggestions given by the experts. The experts' evaluation and corrections prove that the items of the questionnaire were intended to assess intelligence as the items are directly related to the concept of crystallized intelligence.

d) Establishing Reliability

Test-Retest Method

The reliability of the questionnaire was established using the test-retest method. The draft tool with 34 items was administered to 45 teacher educators, who were selected randomly from Mar Chrysostom College of Education, Kirathoor and Bethlahem College of Education, Karungal in Kanyakumari District and St. Johns College of Education, Palayamkottai in Tirunelveli district. After an interval of 14 days, the same questionnaire was administered and data were collected from the same group of teacher educators from the same institutions. The two sets of data were statistically treated and the correlation between the two scores was found. Thus the reliability coefficient of the questionnaire was established as 0.845.

Final Tool

The final tool consisted of 34 items under three dimensions namely Academic Knowledge which covers Philosophy, Psychology, Technology and Pedagogy with 10 items, Vocabulary & Reasoning with 10 items and General Knowledge with 14 items. The items were in the

format of multiple choice questions with four responses. The right response carries a score of 1 and the wrong response was allotted 0 score.

Crystallized Intelligence Questionnaire (CIQ)

1. The most appropriate meaning of learning is
   (a) Inculcation of knowledge
   (b) Modification of behavior
   (c) Acquisition of skills (d) Personal adjustment
2. The aptitude of a person for taking teaching profession could be tested on the basis of
   (a) His/her achievement standards in his/her courses of study
   (b) His/her imposing personality for controlling classes
   (c) His/her attitude towards persons whom he has to teach
   (d) His/her enthusiasm to display his knowledge
3. Educational psychology helps the teacher to
   a) Motivate the learners for learning
   b) Modify his/her teaching in accordance with individual differences
   c) Study the personality of learners and plan his/her way of action
   d) All of them
4. If a student reproduced the learnt material without any manipulation, then it is called
   a) Whole memory b) Rote memory
   c) Perfect memory d) All of these
5. Which of the following is NOT a type of CAI?
   a) Tutorial Type b) Educational Game Type
   c) Simulation Type d) Situational Type
6. Texts, Graphics, sounds, animations and videos are incorporated by you in your teaching, that means you are using
   a) e-Content b) e-Education
   c) Multimedia d) Digital Media
7. The educational philosopher must have knowledge of psychology because
   (a)Psychology acquaints the philosopher with the world of reality
   (b) Psychology is after all a branch of philosophy.
   (c)Psychological principles arise out of philosophical maxims
   (d)The question of 'why' and 'what' in philosophy is purely psychological at the root
8. Which of the following statements is NOT correct?
   (a) A good communicator need not be a good teacher
   (b) A good communicator has wide reading
   (c) A good communicator has good sense of humor
   (d) A good communicator has command over language
9. As an educator, you can use observation method in
   a) Classroom situation b) Sports situation
   c) Lab situation d) All of these
10. A learner goes from the first frame to the second frame only if he makes the correct response. If he makes an error, then he is led to a remedial frame where he is given more help in understanding the concept. He will then be directed to the original frame number one. He reads again and answers correctly in the light of remedial material received. This is the procedure of
    a) Linear Programming
    b) Forward Branching Programme
    c) Backward Branching Programme
    d) Extrinsic Programming
11. Fill up the blank with the appropriate word: 'The decisions of the teacher will ___ the entire nation.'
    a) Impact b) Impress
    c) Implant d) Implement
12. What is the synonym of the word 'Pedagogy'?
    a) The method of teaching b) The method of learning
    c) The art of teaching d) The art of learning
13. What is the meaning of acknowledgement?
    a. To become sick through contaminated food
    b. To admit or recognize that something is true
    c. To show great knowledge
    d. To deny something's existence
14. If your colleague always thinks the best will happen, then he/she is:
    a) Creative b) Outgoing
    c) Optimistic d) Confident
15. Choose the word which is least like the other words in the group
    a) January b) May
    c) July d) November
16. Identify the odd one
    a) Explaining b) Reading
    c) Questioning d) Illustrating with Examples

17. A book always has
a) Chapters b) Pages
c) Contents d) Pictures

18. Study: Knowledge :: Work : ?
a) Experiment b) Service
c) Experience d) Appointment

19. Arrange the following words in a meaningful order.
1. Probation 2. Interview 3. Selection
4. Appointment 5. Advertisement 6. Application
a) 5,6,3,2,4,1 b) 5,6,4,2,3,1
c) 6,5,4,2,3,1 d) 5,6,2,3,4,1

20. When you visit any historical place, you try to
a) Feel the weather and enjoy the break of a monotonous life
b) See the uniqueness of the architectural design
c) Explore the cultural or social aspect of the design
d) None of these

21. Who chairs the Governing Council meeting of NITI Aayog?
a) NITI Aayog CEO b) President of India
c) Prime Minister of India d) Union Finance Minister

22. Government established the UGC by an act of parliament in the year
a) 1950 b) 1948
c) 1953 d) 1956

23. The state with most deemed universities is
a) Tamil Nadu b) Andhra Pradesh
c) Karnataka d) Maharashtra

24. Which of the following days is celebrated as National Education Day?
a) September 5 b) October 2
c) November 11 d) November 14

25. The constitution of India is divided into
a) 20 parts b) 21 parts
c) 22 parts d) 23 parts

26. Indian Maritime University, Chennai is a
a) State University b) Deemed to be University
c) Central University d) Private University

27. MOOC stands for
a) Mass Open Online Course
b) Massive Online Open Courses
c) Mass Online Open Course
d) Massive Open Online Courses

28. The position of Indian Higher Education with regard to student enrolment is
a) First b) Second
c) Third d) Fourth

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29. The chairman of New National Education Policy (2020)
a) K. Kasturirangan b) Shakila T. Shamsu
c) Ramesh Pokhriyal d) Vasudha Kamat

30. Access, Equity, Quality and Accountability are the four pillars of
a) Indian Higher Education
b) Teacher Education in India
c) New National Education Policy (2020)
d) Constitution on India

31. In 2006, Singapore, China, Japan & other nations announced a proposed plan to restore and revive ..... Indian University as an International University.
a) Nalanda b) Takshila
c) Ajantha d) Ujjain

32. SWAYAM stands for
a) Standard Webs of Active-Learning for Youth Aspiring Minds
b) Study Webs of Active-Learning for Young Aspiring Minds
c) Standard Webs of Active-Learning for Young Aspiring Minds
d) Study Website of Active-Learning for Youth Aspiring Minds

33. Identify the Centrally Sponsored Scheme (CSS)
a) UGC b) NCTE
c) RUSA d) AICTE

34. 'To achieve planned and coordinated development of the teacher education system throughout the country, the regulation and proper maintenance of Norms and Standards in the teacher education system and for matters connected therewith' is the major objective of .....
a) UGC b) NCTE
c) NCERT d) AICTE

Conclusion

Delwin & Punitha's Crystallised Intelligence Questionnaire (DPCIQ) was constructed and validated with

the purpose of measuring the crystallized intelligence of teacher educators exclusively. The investigators have the faith that this questionnaire will be beneficial to the teacher educators for analyzing their present status of crystallized intelligence and in that light they can think of ways and means to enhance their crystallized intelligence. Similarly, it will be useful for the future researcher to construct tools for crystallized intelligence of various populations of study.

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