

Use of Bronfenbrenner’s Ecological model as Pillars of Educational Research for hypothesis formulation

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ABSTRACT:

The purpose of this paper is to demonstrate the applicability and usefulness of the Bronfenbrenner’s Ecological model (Bronfenbrenner ,1977) in educational research. The key concept of this paper is adapting and contextualizing the model to fit for purpose in Educational research. The original theory is development of the child and this papers details how the child as a leaner is placed at the center of the model and the different outer layers, called systems, contain the factors that impact on his education and academic performance. This gives rise to series of hypotheses. Hypotheses are the foundations of the research and the study and methodology employed will then demonstrate whether the hypotheses are Null or true. A hypothesis is a statement of the researcher’s expectation or prediction about relationship among study variables (Polit,2012). In this particular educational research 27 hypotheses were extracted thus, there were 27 null hypotheses and 27 positive hypotheses that affirm the statements. This paper is a basic research whose applicability can be used in several other educational research.

KEYWORDS: Bronfenbrenner ecological model, hypothesis, Education, academic performance

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I. INTRODUCTION

The Bronfenbrenner’s model was developed by the psychologist Urie Bronfenbrenner. This theory of ecological systems explains how human development is influenced by different types of environmental systems. Urie Bronfenbrenner's Ecological System Theory (Bronfenbrenner, 1977; Bronfenbrenner & Morris, 1998), often called the bioecological model, depicts the lifelong progressive accommodations that individuals make regarding the changing environments they encounter. Bronfenbrenner’s theory is concerned on the quality and context of individuals’ life as viewed through the different developmental phases that occur within the context of complex interrelated complex systems. The individuals’ environments and ecological realities influence their development, including behavior. Positive, healthy, and safe social environments are important for necessary prosperous development of the child. This model described that people are directly influenced by systems, such as family, school, and workplace; and indirectly by policies, resources, and expectations of others. Dynamic environments are important influences on developing individuals, and that in turn, individuals are capable of influencing their environments.

Personal characteristics, such as intelligence, temperament, physical appearance, and activities in which the person engages, such as social interactions, physical activities, and maintenance tasks, can influence the environment and its impact. Bronfenbrenner interpreted this “bioecological paradigm” in his model, and related it to the process-person-context-time phenomena. Bronfenbrenner & Morris (1998) discussed the four dimensions as process, persons, context, and time and being key components in the developmental process. Based on these dimensions, Bronfenbrenner (1977) developed two core propositions for understanding human development through his ecological theory. Bronfenbrenner (1977) conceptualized his theory in terms of nested systems ranging from micro to macro: microsystems, mesosystems, exosystems, and macrosystems. He emphasized that human development was determined by these four levels of systems. The multidimensional environmental sources were described to influence individuals. The chronosystem was then added to his theory, which includes the concept of individuals as constantly changing over their lifespan and how the time period in which they live influences their approach to their environment.

Two important adaptation was made to fit the model to Educational Research on performance.

- (i) Firstly the model was contextualized and adapted to Educational Research and the Student was put at the center of the Theory instead of referring to a child or a person. The Development of the Student was influenced by these different layers.
- (ii) Secondly , according to the original theory, these different layers affect the development of the child and her the student , it does not make reference to the studies of the child even though development is

related to educational characteristics such as learning. With the Student at center, these different layers and system were extracted to be impacting factors of the educational development of the child.

The assumption of adapting the Ecological model to the educational research on Academic Performance of students is that what affects the development of the child also affects the educational performance of the student. Literature review of past research on the field of education and academic performance gave an indication of these same corresponding factors such as the environment, family, friends, the society, laws, policies etc. At later sections of this paper, the process of how the hypothesis were developed has been explained.

II. METHODOLOGY

The method used in this research paper was the review of several literature and past research on the topic. No data was needed to be collected as such through any instruments for this paper. A review of what is the Bronfenbrenner 's Ecological Model was explored and its applicability to Educational Research was examined. The purpose of Exploratory research is infact to clarify concepts that are not actually clear. The Bronfenbrenner' Theory is a very ambiguous theory which is not often property used, and not contextualized to fit for purpose. At the end of the research a better understanding of the topic being explored is expected. The research will not always produce new answers to questions but rather explanation on the concept so that other research can make use and give a better meaning to their methodologies. This is why it is referred to as basis research. 3 questions need to be answered in this paper:

- (a) What is the Bronfenbrenner Ecological Model and Theory?
- (b) Who will use the theory?
- (c) Why is this theory used in Educational research?
- (d) How will this theory be used, adapted and contextualized in Educational research?
- (e) To demystify the myth and ignorance that Hypotheses can be extracted from Bronfenbrenner Ecological Model and Theory? And thus prove doubters wrong.

Exploratory research is effective in laying the groundwork that will lead to future studies Even though it can point the researcher in the right direction towards what is the answer, it is usually inconclusive (BRM,2022). Singh (2007) stated that exploratory research is the initial research, which forms the basis of more conclusive research. It can even help in determining the research design, sampling methodology and data collection method. The difference between exploratory and conclusive research (Sandhursen ,2000) is that exploratory studies result in a range of causes and alternative options for a solution of a specific problem, whereas, conclusive studies identify the final information that is the only solution to an existing research problem. Nargundkar (2008:38) states that Exploratory studies usually create scope for future research and the future research may have a conclusive design.

III. DISCUSSION

The theory of Bronfenbrenner was constructed to examine the forces that have shaped human development in the past, but also those that may already be operating today to influence what human beings may become tomorrow. (Bronfenbrenner & Evans, 2000:117). The diagram Figure 1 identifies the different layers of Human Development.

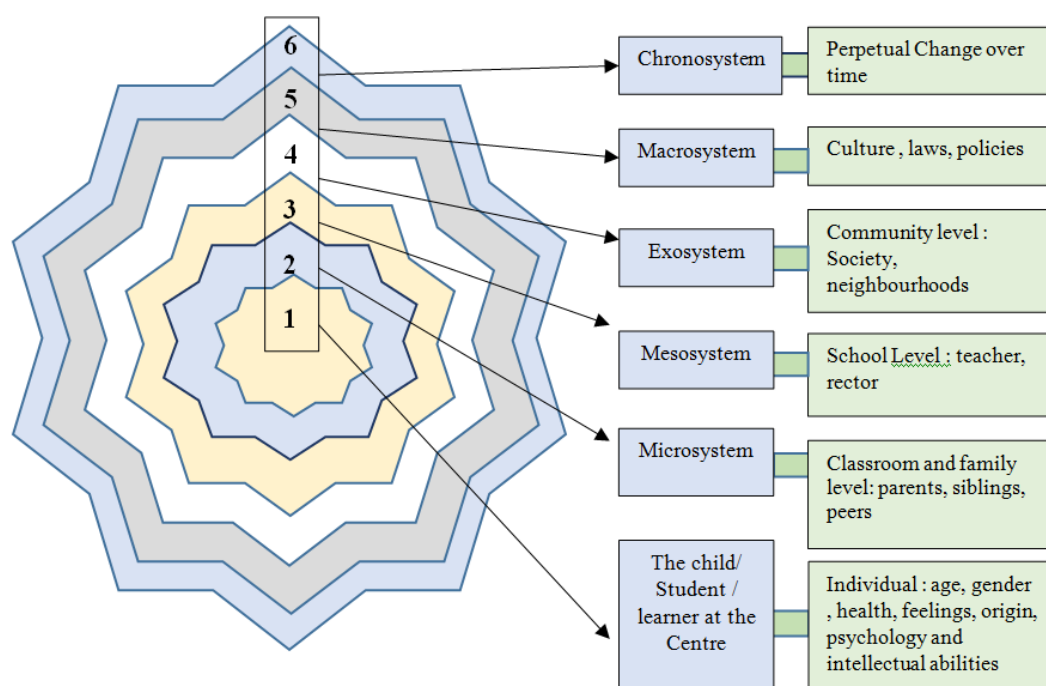


Figure 1 showing Ecological model adapted, contextualized from Bronfenbrenner (1979)

The first area is the core, the centre of the shape. It represents the child, the student who is affected by what surrounds him/her. It comprises, his age, gender, health, feelings, origin, his psychological state and intellectual abilities.

The ecological model consists of five systems of interaction that the former is nested in the latter: 1) Microsystem, 2) Mesosystem, 3) Exosystem, 4) Macrosystem, and 5) Chronosystem. From the time it was newly developed four decades ago, till now, the Bronfenbrenner's model has been applied in various fields of study, such as Children's mental health (McLeod & Shanahan, 1993), pediatric injury (Schwebel & Brezaussek, 2007), suicidal ideation (Langhinrichsen-Rohling, Snarr, Slep, Heyman, & Foran, 2011), and identities of mixed-race college students (Renn, 2003), training environment (Lau & Ng, 2014) and working with immigrant students (Paat, 2013; Stebleton, 2011). Microsystem is the most inner circle, microsystem, is a "pattern of activities, roles, and interpersonal relations experienced by the developing person in a given setting with particular physical and material characteristics" (Bronfenbrenner, 1979:22). A mesosystem is defined as a collection of microsystems and how these systems interact with each other (Bronfenbrenner, 1977). The exosystem includes "other specific social structures, both formal and informal, that do not themselves contain the developing person but impinge upon or encompass the immediate settings in which that person is found, and thereby influence" (Bronfenbrenner, 1977: 515).

The macrosystem is "the overarching institutional patterns of the culture or subculture, such as the economic, social, educational, legal, and political systems, of which micro-, meso-, and exo-systems are the concrete manifestations" (Bronfenbrenner, 1977: 515). The chronosystem represents the impact of time on this system of nested relationships; all of the sub-systems are situated in time and can change over time (Bronfenbrenner, 1992)

IV. FINDINGS

The study is about what affects the performance of students. Usually denoted by $H_0, H_1, H_2, H_3, \dots, H_n$. Dayanand (2018) defined the hypothesis H_n , as the researcher's expectation about relationship among the variables and factors of the research. The hypothesis is the omega and the alpha, the beginning and the end of the research. The hypothesis is formulated from literature and reviewing past research work. Hypothesis is a tentative solution to a problem, it means before finding the results based on the review of literature we are going to formulate a hypothesis based on problem. This is why there is H_0 and H_n . H_0 denies the statement H_n are the positive statements. A hypothesis is a statement of the researcher's expectation or prediction about relationship among study variables (Polit, 2012). The research involves 27 different variables. These variables were extracted from the Bronfenbrenner (1977) as explained below.

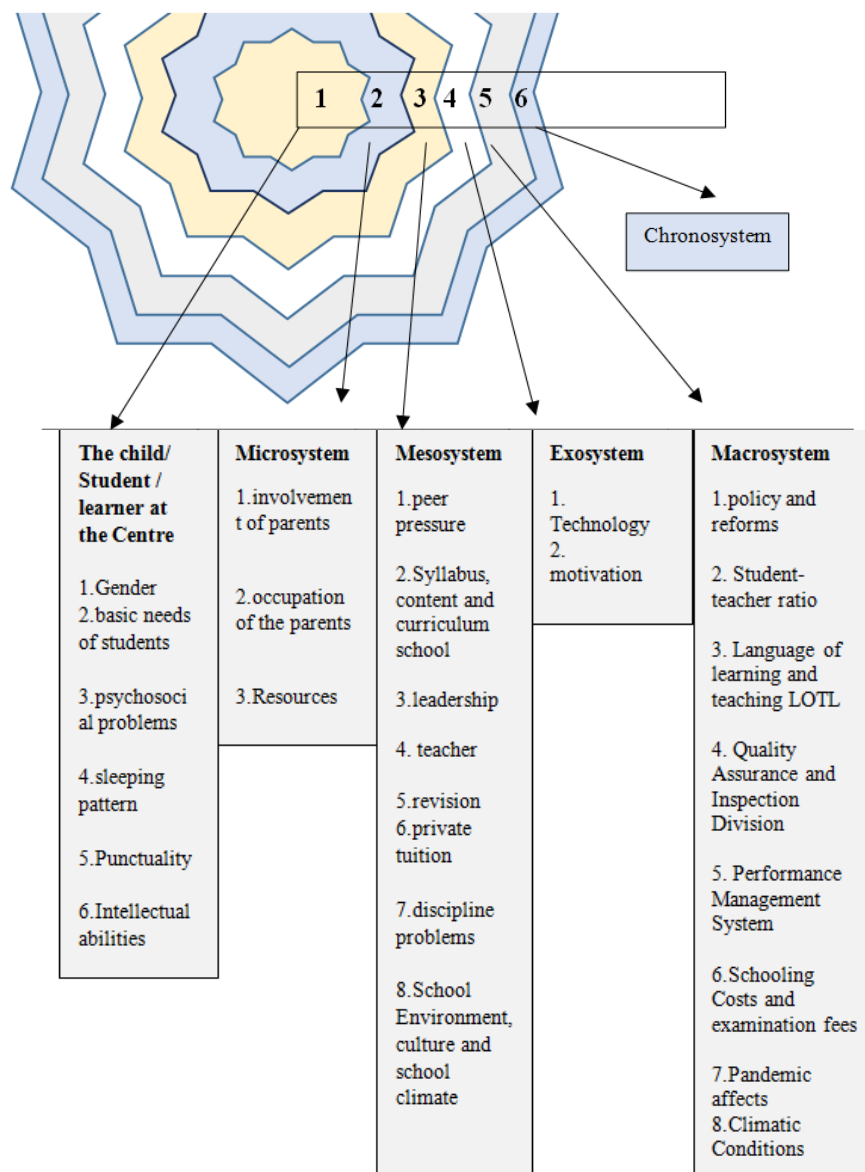


Figure 2 showing Hypothesis extraction from Adapted Ecological model

From the extraction the following hypothesis were formulated.

Null hypothesis is represented by H_0

The other hypotheses are presented by $H_1, H_2, H_3 \dots \dots H_n$.

1	H_0 policy and reforms do not affect the performance and achievement of students	15	H_0 discipline problems do not have an impact on the academic performance of students
	H_1 policy and reforms affect the performance and achievement of students		H_{15} discipline problems have an impact on the academic performance of students
2	H_0 gender of students does not affect the performance of students	16	H_0 motivation does not have an impact on the academic performance of students
	H_2 gender of students affects the performance of students		H_{16} motivation impacts on the academic performance of students
3	H_0 technology factor does not affect the achievement of students	17	H_0 School Environment, culture and school climate do not have an impact on the academic performance of students
	H_3 technology factor affects the achievement of students		H_{17} School Environment, culture and school climate have an impact on the academic performance of students
4	H_0 involvement of parents in the studies of their children do not affect their academic performance	18	H_0 Punctuality does not have an impact on the academic performance of students
	H_4 involvement of parents in the studies of their children affect their academic performance		H_{18} Punctuality has an impact on the academic performance of students

5	H_0 occupation of the parents and their level of education (socio economic status) do not influence the performance of children.	19	H_0 Student-teacher ratio do not have an impact on the academic performance of students
	H_5 occupation of the parents and their level of education (socio economic status) influence the performance of children.		H_{19} Student-teacher ratio has an impact on the academic performance of students
6	H_0 Syllabus, content and curriculum do not impact on performance of students	20	H_0 Resources available do not have an impact on the academic performance of students
	H_6 Syllabus, content and curriculum impact on performance of students		H_{20} Resources available has an impact on the academic performance of students
7	H_0 basic needs of students do not affect their performance at school	21	H_0 Language of learning and teaching LOTL do not have an impact on the academic performance of students
	H_7 basic needs of students affect their performance at school		H_{21} Language of learning and teaching LOTL has an impact on the academic performance of students
8	H_0 psychosocial problems of the students do not affect their performance	22	H_0 Intellectual abilities of the student do not have an impact on the academic performance of students
	H_8 psychosocial problems of the students affect their performance		H_{22} Intellectual abilities of the student have an impact on the academic performance of students
9	H_0 peer pressure does not affect the performance of students.	23	H_0 Quality Assurance and Inspection Division does not have an impact on the academic performance of students
	H_9 peer pressure affects the performance of students.		H_{23} Quality Assurance and Inspection Division has an impact on the academic performance of students
10	H_0 school leadership, does not affect the performance of students	24	H_0 Performance Management System does not have an impact on the academic performance of students
	H_{10} school leadership, affects the performance of students		H_{24} Performance Management System has an impact on the academic performance of students
11	H_0 teacher does not affect the performance of students	25	H_0 Schooling Costs and examination fees do not have an impact on the academic performance of students
	H_{11} teacher affects the performance of students		H_{25} Schooling Costs and examination fees has an impact on the academic performance of students
12	H_0 revision time does not affect the performance of students	26	H_0 Pandemic does not affect the academic performance of students
	H_{12} revision time affects the performance of students		H_{26} Pandemic affects the academic performance of students
13	H_0 private tuition does not influence the academic performance of students	27	H_0 Climatic Conditions does not have an impact of academic performance of students
	H_{13} private tuition influences the academic performance of students		H_{27} Climatic Conditions has an impact of academic performance of students
14	H_0 sleeping pattern does not have an impact on the academic performance of students		
	H_{14} sleeping pattern has an impact on the academic performance of students		

After formulating these hypotheses, the data collection process was performed and data through various data collection instruments were collected. The data both qualitative and quantitative were analyzed and conclusions were drawn from the result.

V. CONCLUSION

Hypotheses formulation and use, dates of more than 100 years ago. Gilbert (1896) had made a paper on Natural phenomenon and science, and he explained that in Science, the process through which a natural phenomenon is explained is by method of hypotheses. He stated that Hypothesis is a scientific guess and if the phenomenon were really produced, in the hypothetic manner, then the discovery will serve to verify the hypothesis. Gilbert had developed hypotheses while studying craters and eventually a meteorite was found near the craters and their composition confirmed the hypothesis. To be able to formulate hypotheses, a framework is needed and the Bronfenbrenner (1977) Ecological model provides the required model to extract hypotheses and similar to the craters formed by meteorite impact, these hypotheses form the foundation of the research. It can be concluded that this model is a very detailed and theoretical model with great significance and related to the child and student when put at the center of the model.

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Dedication: This research was put to paper while I was recovering from a head surgical treatment. I, Mr Yudhistir SMF Jugessur, dedicate this paper to my mother who has been my only support in these difficult times, as well as in all these years solitude, harassment, denigration and prejudice.

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