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Curiosity-Driven Study: A Paradigm Revisited

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Abstract

Research has undergone tremendous changes over the years, as technology grows more sophisticated and definitions of what research is continues to evolve. Despite the number of paradigms being developed to address different needs and wants, curiosity has been surprisingly overlooked in recent years. This article will revisit some of the major objectives of conducting research, which is followed by a discussion on the limitations of the paradigms available at present. The article will then discuss the "forgotten" drive in research – curiosity – and argues for a recalibration to place curiosity as the primary drive of research, as oppose to solely focusing on problem-solving, filling gap in literature, giving voice and fulfilling industrial demands. A research framework is then proposed, along with the potential outcomes of the paradigm in social and educational settings. Lastly, the article calls for more studies revisiting the potential advantages of curiosity-oriented research, and how future researchers can benefit from this shift in perspective.

Keywords: curiosity, research, paradigm, methodology

Introduction

Over the years, social research has evolved tremendously. For one, the "traditional dominance of quantitative method" was now usurped, to some extent, as "*the* way of doing empirical research". This shift in paradigm took quite a while, but it was understandable since basic research tend to only "accept the authority of empirical data and ideas or theories" that have stood against data testing (p.8). As a result, quantitative and qualitative research methods are now central to social research (Punch, 2014).

The reason why the quantitative method was first challenged is because the existing methods were deemed too narrow to explore and investigate the multifaceted social domain (p.2). Therefore, it is a good thing for existing theories and concepts to be challenged; it will then lead to breakthrough in newer concepts or perspective that may advance understanding in a discipline.

Conventionally, social researchers are taught to approach research by first considering "what we are trying to find out in research" (Punch, 2014, p. 3). Then, the individual would proceed to frame possible assumptions, hypothesis, research questions based on the existing knowledge and literature that is available. It is only then, one would analyse and clarify the "empirical, technical and methodological considerations" of the study that are aligned to the established research questions. Once these are in place, the study can truly take shape and the researcher is able to proceed with the data collection, and subsequently analysis.

Creswell (2012, p.7) echoed this by laying out the six steps involved in a research process:

i. Identifying research problem
ii. Reviewing literature
iii. Specifying research purpose
iv. Collecting data
v. Analysing and interpreting data
vi. Reporting and evaluating research

While it is noteworthy that some research paradigms would require reordering of the processes, most experts agree that the pivotal part of research lies with the framing of research questions (Creswell, 2012; Punch, 2014). The primary justification for this is the fact that the conceptual framework of any research is very likely to be affected and subjected to the type of research questions that is formulated. This is strongly emphasised by Punch (2014) in regards to what he calls "Methodolatry" – placing the methodological cart before the substantive horse (p.4). He cautioned against the how many research methods book primary focus on theoretical and abtract discussions or descriptions of research methodologies without making strong and concrete links between how we conduct research and how we analyse them (p.4).

Why Do We Do Research?

At present, social research conventions would focus on research problems and questions as the starting point of a study. While Punch (2014) stated that scientific inquiry is to build explanatory theory based on the collected data, much more emphasis is placed on other external motivation and drive. Creswell (2012) further explained that every investigation begins with the identification of research problems based on existing trends. While this is not necessarily a bad thing, placing an issue or problem as the very centre of a research could potentially limit the scope and view on how we conduct research. More importantly, it is very likely that we may end up losing sight of why we do research in the first place. In general, we can categorise the factors or reasons why we do research (Creswell, 2012; Punch, 2014; Strandburg, 2005):

i. To solve an existing problem or issue
ii. To fill gap or void in existing literature
iii. To give voice to the silenced, unheard and rejected
iv. To fulfil demands of various industries

Research Objective 1 – To Solve Existing Problem or Issue

The best paradigms to best represent the desire to problem solve are the quantitative experimental research as well as the more eclectic action research method. In problem-solving oriented researches, the researcher often begins by identifying a problem that needs immediate addressing.

Experimental designs "are conducted to establish possible cause and effect between independent and dependent variables" (Creswell, 2012). This is to further help identify and establish (if any) relation between two or more interactive elements. In many examples, the researcher would attempt to manipulate the possible causes to the identified problem, which is often manifested symptomatically. So as one varies the intervention or treatment, so does the consequences that follows (p.66). By doing so, the researcher could explore possible options of how to prevent, avoid or even rectify the problem.

In very similar ways, action research also embodies this objective very well. Inquiry usually begins from "specific practical and applied problem or question" (Punch, 2014). Action research is more widely used in education and business presently, mainly due to the practicality it brings to its practitioners. It focuses more on the "acts" in attempts to address practical problems (Creswell, 2012). Action research is more flexible than the experimental model, in the sense that it is opened to various

other forms of research methods, as long as the methods help to bring the researcher to a conclusive, practical solution (p.577).

Research Objective 2 – To Fill Gap or Void in Existing Literature

Another possible reason as to why a research is conducted is to identify gaps and complement where existing literature is lacking. Creswell (2012) was explicit in his description of considerations when planning research, in that the study should bring added value to the literature by filling the gap or void (p.62). This is further emphasised in the review of the literature, where one should consider:

i. How the study adds to existing literature
ii. To show that there is a need for research
iii. To convince others to contribute to research

In addition, past researches or topics could also be revisited and potentially extended to produce a more thorough study of the matter (p.63). This could potentially allow us to rediscover knowledge and skills that we overlooked because we were once technologically incapable of investigating or applying in a real-world context.

Therefore, the present ontological view of social research is to identify ways to expand and enlarge our current understanding of the world and her inhabitants. Beyond that, researchers should also form a global network of investigators in which its members collaborate and cooperate. This is best represented by the number of publications, journals, reviews, conferences that are organised throughout the world.

Research Objective 3 - To Give Voice to the Silenced, Unheard and Rejected

Humanism dictates that achieving self-actualisation or self-enlightenment is the top priority of every individual (Richards & Rodgers, 2014). However, not everybody has the means and access to achieve this. This is why research is important, especially in social science, for it helps to empower and emancipate societies and communities that are suppressed and oppressed.

This is more common in qualitative research, where it is "mainly concerned about describing the social world for particular purposes" (Punch, 2014). Doing so allows the researcher to paint a realistic picture of the grievance or sufferance of a minority. This is further supported by the usual practice of social researchers – they study people, things and events in the natural setting, subscribing to the naturalistic ontological view of research (p.141). This inadvertently helps to describe and explain the things that they are studying to a wider, global audience. This would also go on to be very helpful as such research will "inform policy debates" (Punch, 2014), be it at the legislative or administrative level of the government.

Nonetheless, the traditional role of the researcher is now under challenged. The emergence of feministic approach to research is a good example where plenty of focus is given to power dynamics in research especially in regard to issues like gender, ethnicity and equality (p.135). In conventional discourse of research, the researcher is sometimes seen as a "masculine saviour/rescuer". But in the feministic approach, emancipation of the self is the primary goal (Hammersley, 1995 in Punch, 2014, p.135). In other words, the silenced, unheard and rejected no longer need to be rescued; research has become the same tool that they can wield that becomes their very own voice.

Research Objective 4 – To Fulfil Demands of Various Industries

Another benefit of research is it improves current practice (Punch, 2014). A practice would usually be discovered and regarded as obsolete once findings from new studies and researches are disseminated to respective stakeholders.

Hence, various industries that make up a healthy, vibrant and robust economy would require a consistent production of human resource and intellectual property through efforts of research and

development. In many ways, research is an ongoing process that aims at fine-tuning practical application in everyday life. It also serves as a mechanism to link theory and practice (Punch, 2014).

Jackson & Ward (2012) stressed upon the importance of research "in developing surface knowledge and skills" that furthers and advances "intellectual capability in analysis of data", hence achieving the aim of meeting the needs and demands of the industry (p.3). The applications that are derived from the findings of these research are invaluable to the technological and social developments. This is possible because of the focus on "mission-oriented research" that comes along with "evident and pre-envisage" potential practical application (Bryatt & Cohen 1969, in Gibbons, Michael, Greer, Jevons, Langrish & Watkins, 1970).

In other words, research is sometimes more on ensuring the continuity and fluidity of societal and economical functions, achieved through the act of balancing supply and demand.

The Limitations and Shortcomings in Current Research Paradigms

Nonetheless, there are growing concerns regarding the limitations and shortcomings of these established research protocols and paradigms. For one, over-emphasis on research methods can "constrain and influence" (p.5) the type of questions that researchers intend to ask (Punch, 2014). Too often we find ourselves framing our research questions, sampling and data collection methods to fit into the existing research structure.

Researchers are sometimes blindsided by the very structure that is initially created to help construct and plan an investigation. Brewer & Hunter (1989, in Punch, 2014) warned that dogmatic and rigid adherence to any form of research would:

a. Prevent researchers from investigating new research areas
b. Prevent researchers from acknowledging exploratory nature of the research
c. Encourage inappropriate use of verificational logic and rhetoric
d. Discourage development and use of systematic empirical procedures for generating as well as testing theories

Another possible limitation of current approaches in social research is the persistence on placing problem-solving as the crux of research. While problem-solving oriented studies are very beneficial and helpful in addressing immediate concerns and issues, it has also come to impede development and progress in some ways.

For example, most research methodology textbooks maintained that one should only investigate and study a problem or issue "if it potentially contributes to educational knowledge or adds to effectiveness of practice (Punch, 2014, p.61). The value of a proposed study is dependent on its ability to garner high *return-of-investment*. If the findings of the study can *solve* a problem, then it could be presented as a cost-saving or time-saving solution. Hence, the study is usually considered if is worthy of investing time and effort.

This forms the main crux to the problem involving all research, not only limited to social or educational research, that "interesting interactions are *sparse* [emphasis added] unless actively sought after" (Haber, Mrowca, Fei-Fei, & Yamins, 2018). It is such a loss that the inquest of understanding and knowledge is passive and reliant on the extent of the rewards of conducting a study or research.

Binson (20009) also lamented the fact that we often end up pre-empting what is required of us from others, be it our superiors, institutions or even by abstract notions of social norms, that we have to cater our work in response and modify our assumptions to suit these expectations, even to the point of fabrication (p.20). This, she further argues, does not yield authentic or genuine scientific research.

Therefore, while it is undeniable that monetary or intellectual recognition are important motivational drives in a researcher, they cannot and should not be the only motive for one to study or research

something. (Strandburg, 2005) affirms this notion, claiming that there is growing indication that "industrial support of university research" can discourage what she calls "curiosity-driven research endeavour" (p.95).

When we are so fixated in solving problems we encounter, applying theories into practical situations, giving voice to someone or even filling a gap in our present understanding, we are but supplying what is demanded of us. It is further argued that this is the very reason why basic scientific research agenda is less likely to be skewed in exchange for short term rewards (Strandburg, 2005). Without the financial incentives or considerations regarding career advancement to distract them (Strandburg, 2005, p.97), basic scientific researchers can focus on their studies, driven by one primal human nature – curiosity.

The "Forgotten" Drive and Motivation in Research

There are several definitions of what curiosity is in existence but one that is particularly apt for the context of research is extrapolated by Arnone, Small, Chauncey, & McKenna (2011):

> Curiosity can be a powerful motivator of behaviour, initiating actions directed at exploring immediate environment to resolve uncertainty and make the novel known. (p.181)

There are two vital direct outcomes of curiosity-driven exploration, according to the definition, which are *resolving uncertainty* and *understanding the unknown*. Based on these two concepts, we conduct research to make certain of what we yet to understand as well as to shed light on what is new to our environment. Interestingly, curiosity was never explicitly mentioned or referenced as a direct source of motivation to study something in academia.

Binson (2009) strongly advocates the use of curiosity as a starting point for learning in schools, mainly because curiosity is not only a strong source of internal and intrinsic motivation, but also the "motivational fuel for learning" (p.14). When applied and transferred into the context of research, it is apparent that we are less focused on discovery for the sake of discovering, research for the sake of researching and studying for the sake of studying. Instead, research is conducted to fulfil certain expectations in our role as academics or industrial employees.

For this reason, Strandburg (2005) defended the importance of basic scientific research in light of ever-increasing resources poured into industrial scientific research. Her view on this matter is due to her opinion that "curiosity-driven research is to provide a demand function" to "unpredictable" (p.93), pure and basic research. This will help to provide "long term viability" to foster studies and research, which could lead to technology and intellectual transfer into various industrial application and to those who need problem solving. But industrial application and problem solving should not take precedent over curiosity-driven research.

By no means this article propagates that current research paradigms ignored and overlooked the role of curiosity in research. Instead, as discussed earlier, many major research methodology textbooks highlight on the framing of research questions. Against the possibility of information overload and deviation from intended focus, researchers are advised to put "questions before methods" (Creswell, 2012; Punch, 2014). The formation of good research questions cannot be done completely devoid of curiosity. In this sense, all research and studies should be directed and oriented based on curiosity.

Unfortunately, it is also a fact that "question development is often underemphasised" (Punch, 2014). As such, curiosity has also ended up on the sidelines when other sources of motivation take priority over it.

Curiosity-driven Study

A new paradigm is then required, to redivert our attention back to curiosity being the primary drive to research. To do so, we need to place curiosity as the starting point and the primary drive of a study. The major tenets of this paradigm are as follows:

i. Curiosity as the primary motive
ii. Curiosity as the driving motivation
iii. Eclectic data collection and data analysis strategies
iv. Literature is reviewed last

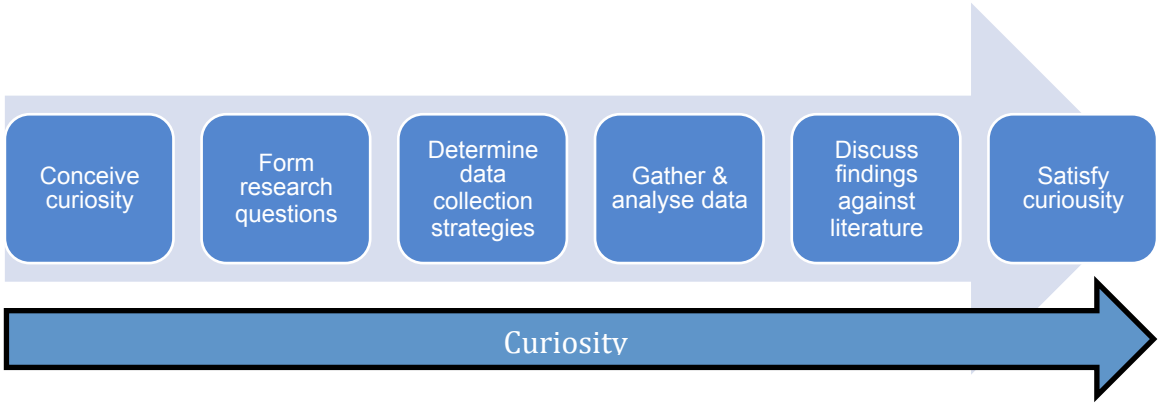

Figure 1 Curiosity-driven study framework

Starting with a curiosity

In this framework, "curiosity" embodies more than an instinct or hunch. Humans are curious by nature, which is easily ascertained by "the way babies evoke all their senses" in their quest to explore their surroundings (Arnone et al., 2011). This is further built upon by Haber et al. (2018) where in the early years of life, humans bear an intrinsic drive to execute and demonstrate "wide range of interesting, apparently spontaneous behaviours" (p.1). To clarify, what is deemed "spontaneous" does not mean that the actions when we were once infants occur at random. Instead, these were driven by our own perception of the world around us (Schmidhuber, 2010 in Haber et al., 2018), allowing us to build a world model of our own.

If past research has proven the important role of curiosity in the development of the young, it is now less prevalent and significant in adult learning. Studies among children indicated that "curiosity level steadily declined at the third grade", which can and usually continues through the ninth grade (Harter, 1981 in Arnone et al., 2011, p.184). It is also noteworthy that curiosity and motivation levels never recover to its original high level (p.184). One possible explanation to this phenomenon is that teachers, lecturers and professors and by extension, the whole education system, tend to spend less time and effort on incorporating strategies that could promote and foster curiosity in lessons, mainly because of an "over-emphasis on mandated curricula and testing" (p.184).

So, to reintroduce curiosity into research, one must be afforded an amount of self-direction and autonomy. Studies indicated that individuals who are given freedom to make decisions about the topic area that they are interested in, as opposed to imposed topics, would learn much more effectively (Jackson & Ward, 2012). This sustains the argument that current research paradigms can be limited and prohibitive, disallowing and dis-encouraging individuals from pursuing topics that they are truly interested in.

Concurrently, new discoveries and developments can be made when the process is curiosity- driven (Arnone et al., 2011). It is argued that curiosity does not only catalyse acquisition of knowledge, but

also "deepening of interest", which leads to beneficial "deep learning", encourage "participation, collaboration and affinity" in the field that is investigated (p.185).

Despite being a powerful drive in learning as well as research, curiosity alone often does not automatically equate to engagement (p.181). Arnone et al. (2011) stressed that curiosity represents a key to a treasure chest of information, but without substantial information management skills, one could just easily get frustrated by the overload of information. Likewise, lack of resources and facilitation could prove to be a discouragement. They summed up by stating that refined mental constructs like personal interests, engagement and motivation are crucial to sustain a curiosity-driven study (p.183).

A treasure hunt is not fun without a treasure map and the accompanying hints. It is unlikely to be fun if one must do everything alone. Solomon (2003) and Brew (2003) reiterated the importance of supporting scaffolding that helps to facilitate studies and research (in Jackson & Ward, 2012). Because of these reasons, it is apparent that the need for clear conceptual framework is pivotal for a curiosity-driven study.

Forming research questions

What started out from a curious notion should be transcribed into research questions, which could help outline a conceptual framework for the study. This will "give direction and coherence" to the researcher (Punch, 2014), as high amounts of uncertainties are almost guaranteed in curiosity-driven studies.

It is suggested that when framing research questions, with the initial notion in mind, we ought to consider: (a) what question is the research trying to answer? (ii) How will the research answer these questions? (p.40). In this sense, this is very similar to the established educational research methodologies.

But a more important reason is at play – the framing of research questions is to ensure that "individuals initiate direction in the topic based on own interest" (Binson, 2009, p.17). This will return more autonomy and self-direction to the researcher in determining what he wants to study, instead of solely fulfilling industrial demands of gaps in the literature. This is further echoed by others, strongly believing in the freedom for self-determination when it comes to refining the focus of the study and investigative strategies (van Schijndel, Tessa J. P., Jansen, & Raijmakers, 2018; Jackson & Ward, 2012; Haber et al., 2018).

Determining data gathering & analysing strategies

Punch (2014, p.17) very aptly said that what we want to find out will directly influence how we do something in research. Once a curious notion is translated into research questions, it is then time to consider how those questions are answered. Upon describing all the different quantitative and qualitative research methods in his book, Punch (2014) is of opinion that we need to be more eclectic is the ways we seek answers to the questions we have. When designing any reason, we have to consider:

a. Data collection strategies
b. Conceptual framework
c. Sample profile and method

Drawing from this, we can derive several principles when it concerns curiosity-driven study. As discussed early, once we return the focus of a study to the initial notion of curiosity, everything else should revolve around it. Likewise, data collection and analysing strategies should also reflect this belief. We would be less concerned about research methods. Rather, a researcher would evaluate what are the type of strategies that could help him gather the necessary data to help him satiate his curiosity.

This calls for an employment of "minimised hybrid approach" (p.2), focusing more on data gathering strategies as opposed to research methodologies. This would help individuals to develop abilities to

research according to their own preference (Jackson & Ward, 2012). A direct result of this would be empowering individuals to be researchers that is "equipped to take charge", choosing the questions to investigate and deciding how to answer those questions (Khun, 2005 in Jackson & ward, 2012, p.2).

Similar to research methods like action research and case studies, curiosity-driven studies should be multidimensional and pluralistic, employing and utilising methods that are deemed suitable to reach a conclusion or understanding (Creswell, 2012; Punch, 2014). This subscribes to the proposition that "over-reliance on any *one* [own emphasis] method is not appropriate" (Punch, 2014, p.235). This would mean we ought to transcend past the boundaries and limitations of research methodologies.

Discuss findings against existing literature

Usually, literature is reviewed early in a research for many reasons (Creswell, 2012), although there are disparities when it comes to different approaches to research. In *theory verification* research paradigm, the main aim would be "to explain whatever is being studied" (Punch, 2014, p.16). To do so, a researcher must have working understanding towards a concept or theory before it can be tested in the field. Thus, literature becomes an integral part of analysing and planning, as literature review is developed before the commence of a study (Punch, 2014).

In *theory generation* researches, the literature comes later in the study, as the focus is more on pro0ducing a working theory based on collected data (Punch, 2014). Literature is "deliberately delayed" until the researcher is able to identify directions that emerge from "early analysis of the data" (p.41). The rationale for this is the possibility for literature to influence the process of developing theories when introduced too early in the study, to the extent of "precluding development of some new discoveries" (p.42).

In a curiosity-driven study, it is suggested that literature is only consulted when the findings are present. There are some advantages to this. If the need to conduct research on the basis that we need to "fill in a gap" or "fulfil a demand", then consultation of the literature will not have to take precedent in a study. Working on a literature early on in the study will very likely discourage one from investigating further, once it is discovered that the scope of the study has been covered previously. This will modify how a study is planned and executed, potentially even scrapped.

There are several drawbacks to such approach. In the event that we unknowingly (yet could have easily known by consulting literature) repeated or replicated a study that has been conducted before, it would entail a waste of resource and time. From an industrial and economic point-of-view, this will present a very low and negative return-of-investment, even more so for academic institutions.

But there are several counter-arguments to oppositions against conducting literature at the end of the study. Firstly, by reviewing literature last in a research, one would not be too concerned whether investigating what he is curious about has been studied by someone else. He could then persist in executing planned strategies to research what he wants to find out, considering that the value of curiosity-driven study is in the process of acquiring knowledge. Jackson & Ward (2012) strongly suggested that "a researcher who employs curiosity…actively seeks out existing or discovering new knowledge" as opposed to "passively soaking up knowledge" (p.2).

Secondly, delaying literature towards to end of the study would be able to provide "a contrast or comparison with the major findings in the study" (Creswell, 2012). Since literature is absent till the final stages, a researcher could evaluate the effectiveness of his own data collection strategies. If the findings agree with existing literature, his data collection strategies would be vindicated through the findings in the context of his own research. If the strategies employed differs from existing literature, he could have discovered different strategies of investigating the topic of interest.

Because literature is not consulted in the planning stages, it is very likely that the strategies used, and findings are similar to what was done previously. Yet, it would still be a worthwhile effort, for the researcher has engaged in a highly personalised investigation that bears intrinsic value to his own

development and understanding. Particularly relevant in social and educational research, repeated or replicated studies over time such as longitudinal and cross-sectional studies often produce different findings due to the dynamic nature of people.

Satisfy curiosity and investigate potential application

Once the curiosity-driven study reaches saturation, in the manner that the researcher absolved his curiosity, one can then consider the study completed. This is usually the most climatic part of the whole investigative experience, where one, through research, can potentially:

a. Achieve empowerment (Creswell 2012; Punch, 2014)
b. Obtain emancipation (Punch, 2014)
c. Refined and better understanding (Punch, 2014, Haber et al, 2018)
d. Direction for future studies (Creswell, 2012)
e. Improve practice (Creswell, 2012)

Specifically, in terms of curiosity-driven studies, one can:

a. Increase level of autonomy and self-direction (Jackson & Ward, 2012)
b. Sustain curiosity (Binson, 2009)
c. Encourage self-reflection and raise awareness (Binson, 2009)

Similarly, a study on curiosity-based learning programmes reported that respondents experience "high level of satisfaction" which resulted in an "increase in scholarlistic self-confidence" (Binson, 2009, p.21.) This helps to promote a form of research that can "satisfy the curiosity and interests of the research community" (Strandburg, 2005, p.96). Respondents also indicated that they like and enjoy the use curiosity as a starting point in their learning, as they are challenged to "think in a broad way, outside the box", with little emphasis on producing "right or wrong answer" (Jackson & Ward, 2012). This is a luxury that many industrial and academic research do not really accommodate or emphasise on, especially when funding and grants are involved.

Another positive outcome of a curiosity-driven study is the accidental or unexpected discoveries and findings. Gibbons et al. (1970) reported in their study that "curiosity-oriented research" yielded scientific advancements such as:

a. Chorleywood bread process
b. Float glass and cryogenics
c. Nuclear power
d. Silicones

These discoveries are more relatable to basic research, but their arguments ring true for social and educational research. They argued that these findings would not have been possible if the studies that "discovered" them were not curiosity-driven in nature, for these studies were designed solely to investigate notions that the scientists deemed to be interesting. It was these curiosity-oriented research that indirectly laid the foundations, passing down knowledge and techniques which were then adapted and applied to be solutions to problems and issues much later (Gibbons et al., 1970). The possibility of discovering unexpected and unpredictable ideas through research (Byatt & Cohen, 1969 in Gibbons et al., 1970) is what makes curiosity-driven study so exciting.

When applied in social research setting, we can greatly enhance the possibility of discovering "important and revolutionary advances" (p.97) because it is difficult to predict the direct outcomes of a scientific inquiry (Strandburg, 2005). By putting less emphasis on the industrial or practical application of the research findings, curiosity-driven studies can "serve as a proxy for the socially optimal demand function for unpredictable research" (p.95). Research can be conducted for the sake of research itself, and this paradigm can give recognition to studies that are done in this manner.

Conclusion & Future Directions

Learning is most effective when one achieves:

a. Affective engagement – enjoyable experience
b. Cognitive engagement – intrinsic drive to learn
c. Participative engagement – imposed goal or objective

(Renninger et al., 2004 in Arnone et al., 2011, p.187)

These three forms of engagement can be achieved through curiosity-driven study, where the focus is on "investigative and explorative" (Binson, 2009, p.17) process of acquiring knowledge and expanding understanding. Such focus is also a reflection of one's intrinsic motivation to learn, as the reward directly benefits the researcher through satisfaction of knowing and understanding more. A result of knowing and understanding something better can be translated to achieving clearly defined goals or objectives, which could lead to practical application of acquired knowledge. To reiterate, practical and pragmatic application should follow after a curiosity-driven study is completed, not at its core.

One would experience these three engagements differently, because "individual differences and preferences will affect learning outcome and lead to variation in behaviour" (van Shijndel et al., 2018, p.997). Even if two individuals choose to investigate the same topic, variations in individual's emotions, levels of thinking and degrees of participation throughout the study may result in different findings. In short, a curiosity-driven study is highly personalised and intimate, especially to the researcher. In collaborated studies, each researcher could end up experiencing differently.

While it is emphasised that the researcher himself maintains autonomy and flexibility to self-direct in his research, collaboration and cooperative with others are equally important. Jackson & Ward (2012) warned that freedom to choose topic areas that appeals to researchers should be counter-checked and balanced with participation in "communities that are constantly collaborating *at the same time* [own emphasis]" (p.5). Binson (2009) also concluded that shared or collaborated curiosity would yield better quality work and more effective studies, adding that "curiosity has to be paired with scholarlistic qualities" (p.16).

Nonetheless, more studies and research need to be done to substantiate the advantages as well as the shortcomings of curiosity-driven study. Most literature regarding the subject looks as curiosity as an overlooked element in education, or in early childhood development. Gibbons et al. (1970) called to conduct studies into "exploring various other avenues through which curiosity-oriented research may lead to various benefits" (p.2), and it seemed that we have not really answered that call. There would be need for future studies designed and planned to investigate the viability and feasibility of the curiosity-driven study framework in a real-world context.

Considering that most literature regarding curiosity originated from the field of education, it will be interesting to see how educators and teachers employ this paradigm in their respective workplace. Perhaps this paradigm can be first piloted in less scholarly journals in education, focusing on publishing to "online journals, websites or local school groups" in the form of public learning communities (PLC), similar to what action research has attempted (Creswell, 2012).
To conclude, research is a process that slowly accumulates, and often what may seem contradictory initially ends up making sense in time (Creswell, 2012). The same applies for curiosity-driven studies. The process of exploring the potential of this paradigm would require time and effort, not to mention the human resources to investigate it. But as Arnone et al. (2011) so eloquently phrased, "it is today's curiosity that becomes tomorrow's discovery that leads to creation and innovation" (p.195).

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