

# Exploring Information and Communication Theory in Graphic Design Education with Activity Theory

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## 1. ABSTRACT

In the context of a university in a developing country, large class size and inadequate studio space have become the bane of graphic design educators. Students go through the process of ideation with limited lecturer-student interaction. The problem has been compounded by the introduction of information and communication technology (ICT), which should be used as an advantage rather than a menace, since educators are not clear with the right pedagogy for ideation. This paper discusses the application of activity theory as a lens, in analysing the process of ideation as a way of looking at distortions in the current pedagogy. It concludes with the conviction that ICT has radically changed students learning practice. Educators need to find a way of tackling this, especially when large classes seem to be emerging.

### General terms

Activity theory, Ideation, Contradictions, design studio

### Keywords

Activity theory, Ideation, Pedagogy, Design process

## 1. INTRODUCTION

The introduction of computers and new technologies is bringing in new ideas and possibilities in design education and its practices. The teaching and learning of graphic design has also seen some of the technological changes. Literature shows the developed countries setting the pace in these possibilities. An online studio was advocated a decade ago as support for learning and teaching [1] [2]. Blended learning, which involves both traditional face-to-face instructions, asynchronous and/or synchronous communication via the Internet, had been introduced and being accepted as alternative learning approaches [3][4]. New courses are being designed in response to growing possibilities of Information and Communication Technology (ICT) in design education [5][6]. Collaborations in design projects are springing up due to the establishment of *virtual design studios* (VDSs).

Developing countries are eager to follow through these technological possibilities and have already started adopting ICT in their education curriculum. Anecdotal evidence suggests that parents are eager to enrol their children in schools that provide computer activities in the basic education, with the assumption that once hardware and software are readily available in schools, ICT integration will automatically follow. Bender and Vredeheef [3] in advocating blended learning in higher education, call for the use of ICT in higher education, to be viewed in a more favourable environment if positive student-learning is to be achieved. The introduction of ICT into the pedagogy of graphic design has seen some challenges especially in the area of ideation as informed by the Bauhaus pedagogy, which has continued to be the basis for current pedagogy. The Bauhaus pedagogy requires strict student interaction with 'studio masters' in formulating and developing ideas in the design process.

The current situation at a university in Ghana where due to lack of space, a studio which originally accommodated twenty-five students is now having a class of one hundred and thirty students, makes it extremely difficult for proper student-lecturer interaction as required by the pedagogy. This problem is compounded with the introduction of ICT, which is encouraging students to go through ideation with little or no interaction with lecturers.

Students have become more digitally proficient, and the computer ubiquitous (Stones & Cassidy, 2010). Updated studies of this kind are still required if we are to understand how to adjust teaching methods accordingly, more so with educators' role in the integration of ICT in graphic design education.

## 2. PROBLEM STATEMENT

Ideation in the graphic design process involves the use of tools and strategies; no matter how 'unrefined' they may be, to reach a defined objective. It involves a range of personal decision-making and creative activities, together with the use of preferred tools and strategies [8]. Brown [9] posits ideation as involving the mind, acting in consonance with the environment or tools for which design sometimes involves sub-consciousness. The process is best described metaphorically as a system basis rather than predefined series of orderly steps [9], thereby challenging the understanding what activities comprise good learning.

In the adoption of ICT in the pedagogy of graphic design in developing countries, there is a presumption that students are no longer focusing on traditional drawing and sketching in the design process. The traditional process requires systematic series of drawings and sketches that follow through with the lecturers' supervision and consent. This process is in contrast with current situation whereby ideas are rather seen to be captured through heuristic thinking [10], divergent thinking or influences from other sources of design on the internet when students sit behind their computers in their quest for solutions in design. The situation has generated some controversy pedagogically, especially with ideation in the digital domain. Researchers however agree that sketching is still essential in the design process of ideation [11][12][13].

The aim of the study, which is part of a larger investigation, was to examine how students go through the process of ideation with ICT, and their interaction with their lecturers, in large classes. The study adopted activity theory as a lens to analyse the contradictions and disturbances being created, when students formulate ideas using ICT. By activity theory, students/learners will have to reach their outcome through the process of ideation (activity); with the interaction of ICT as tools in mediating their actions to reach the outcome. By Engeström [14] extension; the studio acted as a community of practice- that brings into focus, rules (design principle) and division of labour, being lecturer/students interaction and feedbacks at junctures.

The study observed activities of final year graphic design students, numbering one hundred and thirty-two, in the studio and lecture room. Due to the number of students, the class was divided into two sections for effective studio activity. However, this arrangement still did not support effective studio activities. Graphic design is a project-based, which is informed by pedagogy of the Bauhaus ideology of studio method of teaching. This ideology, since the beginning of the 19<sup>th</sup> century, has continued to be the curricula today[15].

After the period of the study, there were enough evidence to show the contradictions and distortions, characterised by ICT with large class. Students were being influenced by ICT integration and were ‘distorting’ the learning process of ideation against the ‘traditional process’. Such distortions stems from design educators’ difficulty in formulating the right pedagogy for ICT in ideation against the traditional principles in graphic design education. Academically, integrating ICT with graphic design education should have a clear pedagogy, based not only on the traditional models of design education. The traditional model, according to Zhang [16], is a group-based, teacher-dominated, and centrally organised pedagogical culture. A refined pedagogy that poses significant real world situations, providing resources, guidance and instructions to learners - as they develop content-knowledge and problem-solving skills - should be educators focus[17]. The study was driven by the following questions: **what happens when students develop ideas with ICT in the studio; what pedagogy informs the process of ideation that allows educators to monitor students’ ideation process in a large class with ICT?**

Activity theory was chosen as a lens, in contrast with traditional research, since it serves as a means of coping with problems of context, situation and practice [18]. Moreover, activity theory could also inform the understanding of the current imbalances in the pedagogy as it situates with ICT. Graphic design is both a rational and artistic activity; a decision-making process that alternates between the consideration of objective information and intuitive leaps [19]. Activity theory has been used as a model for understanding the way designers use tools to achieve objectives, ranging from the routine to the creative [20] [21], and this also apply to graphic design production [8]. Christiansen [22] describes the goal of activity theory as the analysis of actions performed in practice with the aim of explaining why subjects undertake distinct activities in particular ways.

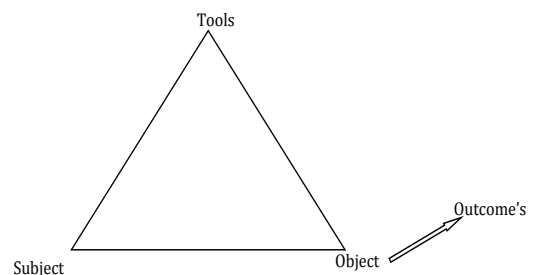


**Plate 1: Picture of a section of the students in class during the exercise**

### 2.1 Brief background of Activity Theory

Activity theory by Vygotsky [23] conceptualises the development of cognitive learning and a framework of terms and ideas, useful in the teaching and learning processes. It was used to understand human activities as complex, socially situated phenomena and go beyond paradigms of cognition,

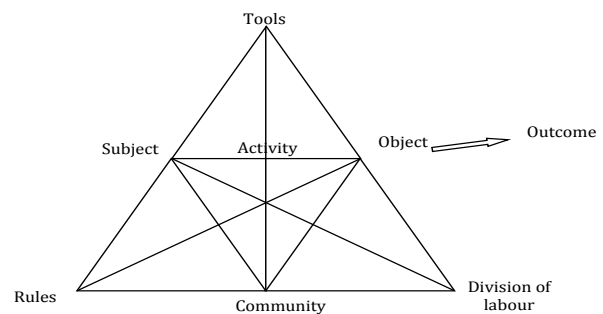
psychoanalysis and behaviourism. The lens of activity theory provides a number of constructs by focusing on activities as the unit of analysis, activities as goal-directed or "purposeful" interaction of a subject with an object through the use of tools. These tools are "exteriorized" forms of mental processes manifested in constructs whether physical or psychological. Activity theory recognizes both internalization and externalization of cognitive processes involved in use of tools, as well as the transformation or development that results from the interaction. The basic unit of analysis in activity theory is human activity. This is a useful model for understanding the way subject (students) use a process or activity to achieve objectives (design process) with tools.



**Figure 1: Basic activity theory by Vygotsky (1979)**

Engeström [14] introduced another dimension – a community – that brings into focus two new relationships: rules mediating between the subject and the community and division of labour; mediating between the object and the community (fig. 2). The major key terms in activity theory include internalization, mediation, subject, object, tool, process (transformation), rules, community, division of labour and outcomes. Kuuti [24] believes that activity theory provides a philosophical and cross-disciplinary framework for studying different forms of human practices as development processes. These processes had both individual and social levels interlinked at the same time. (p. 25).

**Figure 2: Activity theory by Engeström [14]**



### 2.2 Activity theory and human-computer interactions

There is also a relationship between the elements of tools, subject and the object. Nardi [20], who was instrumental in the introduction of activity theory into Human-Computer Interaction (HCI), contrasts activity theory with traditional research as a means of coping with problems such as context, situation and practice. According to him, activity theory provides ‘orienting concepts and perspectives’ and that ‘activity theory is a powerful and clarifying descriptive tool rather than a strongly predictive theory’ [25]. For Christiansen [22], the object and motive can change during the activity, since the relationship of the subject and a tool mediates the object of

activity. Accordingly, the more comfortable a subject is to the tool, the more likely it is that the activity can change.

Tan and Melles [8] made a case for activity theory in graphic design research with the following statement:

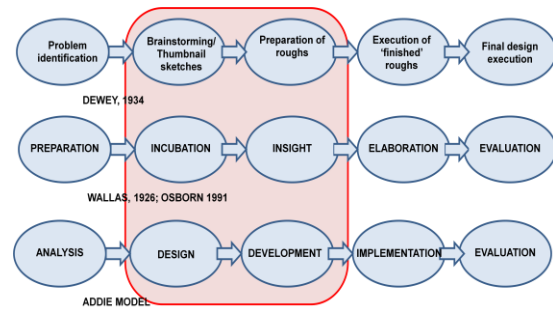
*In comparison to other frameworks..., activity theory appeared to have certain advantages for analyzing situated graphic design practices. While protocol analysis and laboratory studies are commonly used for research into graphic design, activity theory as a framework provides a model that is appropriately oriented towards qualitatively focused studies of real-world practice, where the concern is to achieve depth of data rather than large sample sizes [8].*

Activity theory further emphasizes that our actions derive their meaning from context and therefore our actions should be viewed within a context. For Kuuti [24], activities are longer-term formations; their objects are transformed into outcomes not at once but through a process that typically consists of several steps. Looking through activity theory, we can say that actions are directed at specific conscious goals [26] and as such, actions can be understood within the framework of the activity.

### 2.3 Activity theory, ICT and the design process of ideation

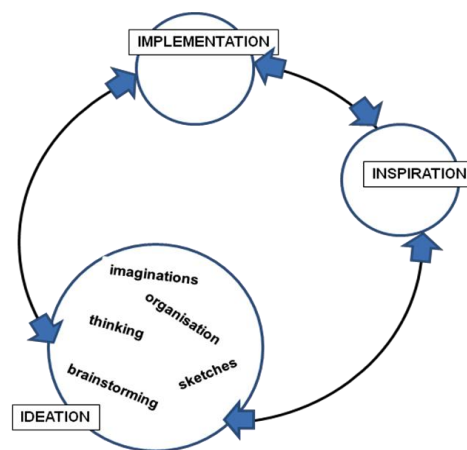
The nature and qualities of the design process is conceived as a creative, branching, iterative, but cyclical process, based on multi-disciplinary knowledge. This cyclical process has to meet the requirements of products-production processes, which are to be structured, to proceed in stages, to meet schedules and to be clearly product-oriented [27]. The purpose of graphic design education is to prepare students for professional practice [28]. It is, therefore, project-based rather than subject-based.

The design process also enjoins the designer/learner to go through series of ideas in coming out with a creative solution for implementation. Dewey [29] described the design process of problem solving in five logical steps: a difficulty is felt; the difficulty is located and defined; possible solutions are considered; consequences of these solutions are weighed; and one of the solutions is accepted. These can also be equated as *problem identification, brainstorming/thumbnailed sketching, rough preparations, execution of finished rough and final design execution*. Other models see the process to include *preparation, incubation, insight, elaboration, and evaluation* [30][31], and this is also captured in the analysis, design, development, implementation and evaluation (ADDIE) model (as captured in the diagram in fig 3). Through the process of *preparation, incubation and insight* (as in Wallas, 1926; Osborn, 1991), ideas suddenly fall into place and a creative solution becomes clear. The fourth stage of *elaboration* is used to check for practicality, effectiveness and appropriateness and the solution elaborated and fine-tuned as necessary. *Evaluation* is where the final solution is checked for its viability or otherwise, and the process may begin again.



**Figure 3: The ideation process in the three models**

The design process is set within the *brainstorming and preparation of roughs* [29]; *incubation and insight* [30][31] and *design and development* (ADDIE model). Though not sharply defined as the ideation stage, they contribute strongly to the design process required to arrive at a solution for a creative work. In the ideation process, the mind acts in consonance with the environment or tools, and involves sub-consciousness sometimes. Ideation processes are not necessary predefined steps, as educators will want us to believe but are the process where ideas are formulated. In his three-phase design-thinking model, Brown [9] put ideation in between “inspiration” and “implementation” loops, and believes that the process will loop back more than once as ideas are refined and new directions are taken (p. 4) as captured in *figure 4*. What Brown [9] describes in his ‘ideation’ circle is nothing but *incubation, brainstorming, rough preparation, design and development*, which eventually will develop an idea for the design process. These areas, technologically involve the use of ICT in today’s design process. According to Kaptelinin and Nardi [18], information technology as a mediating artefact, has a straightforward implication for design (most especially interactions) as it helps people to attain their meaningful goal or objectives [18].



**Figure 4: The design process [9]**

In their article, “Creativity in the design process: co-evolution of problem-solution” [32]), suggest that creativity in the design process can validly be compared to such ‘bursts of development’. However, such an idea might not come strictly from ideation as captured in the process-focus model; but also through the learners’ scanning of the Internet or the web quest. With students interacting with ICT in the ideation process, an action that reaches an outcome through the object becomes more pragmatic. These ideas of pragmatism have common features with activity theory – thought and activity, theory and practice, facts and values [33].

Bender [5] postulates that, as technology becomes more transparent in the learning process and offerings of online courses continue to rise, knowing how technology affects teaching and learning is imperative for educators. With activity theory, the integration of ICT in the design process (including the process of ideation) can be viewed in the broader context of “effective link between, purpose, people, and pedagogy” [34], serving as rules and community in the second generation of activity theory.

### 3. METHODOLOGY

The study presented captured a practical lecture/studio setting where students were given brief on developing an advert for a local telecommunication network provider ‘Expresso’. The observation focused the processes in which students engaged in their lecture room/studio environments with ICT. The emphasis was on the processes of developing ideas, which dovetail to the final execution of the work. There was also the focus on the use of technological tools against the traditional graphic design practice that led to the final presentation of the design.

The participants were final year graphic design students, and the rationale for using them was that they had undergone the basic fundamentals of ideation and had also done, at least, six months’ internship at professional design studios. They were also in transition to the professional world outside the university and therefore were neither novices nor fully professionals. Such a purposive sampling occurs when a researcher wants to identify particular types of cases for in-depth investigation. The purpose is less to generalise to a larger population than it is to gain a deeper understanding of various types of cases [35].

Through notes taking and observation of the activities, visual evidence of documents (designs and thumbnail sketches), as well as conducting open-ended interviews with the participants, data were collected. These were done to enhance the rigour and analysis of the qualitative empirical data gathered and also as a verification method for data triangulation [36]. This was also used as the frame of mind more than as a methodological technique— ‘something that helps to keep your eyes and ears open for corroborating or conflicting ideas or data’ [36].

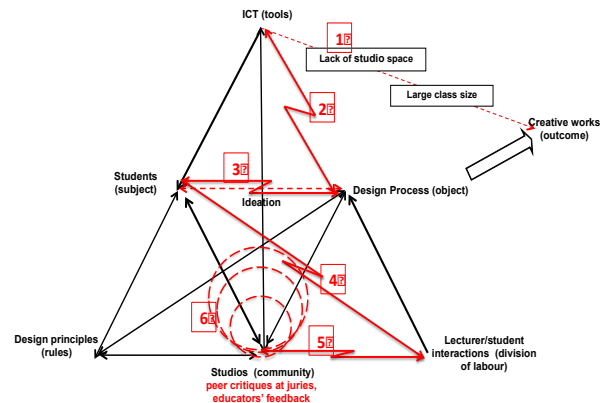
### 4. DISCUSSIONS

#### 4.1 Contradictions and solutions

The students were initially given the briefs and were asked to conceptualise their ideas using pen/pencils in their sketchbooks. When the briefs were being discussed in the lecture rooms, students were seen scribbling ideas in sketchbooks, while others were working on their laptops. At a later date, students met in the lecture room/studio for deliberations and discussions on their concepts. Pencils and sketchbook were used for the initial capturing of briefs and conceptualisation. These sketches were displayed for juries and discussions. Significantly, less than half of the students in the class were able to discuss their thumbnails sketches during formal studio jury creating a contradiction of studio jury (*item 6 in figure 5*). This was because of the setting, and time allocated for this course, albeit that the assignment is an independent study.

Ordinarily, such initial capturing of ideas would have been done at the studio, with strict supervision and instructions from the ‘master’ as with the Bauhaus pedagogy, even though such pedagogy is also inconsistent with the epistemology of constructivist learning. With such directions and supervision, lecturers will be able to track and follow through, the process of developing ideas by students. Subsequently, students were

asked to choose their best thumbnails, refined, scanned and refined them digitally for subsequent class. Within that class,



**Figure 5: Model of activity theory with the contradictions**

the refined sketches were displayed on their laptops, since there was unavailability of LCD projector which allow for other students’ and lecturer’s comments. Such situation deprived students peer critique, which helps to develop more creative ideas, a contradiction as captured through the AT model (*item 5 and 6 in figure 5*). The lecturer then had to move around in the studio, checking on individual digital sketches for discussions and comments (*Plate 2*). Students were later asked to refine their digital ideas in solving the design problem as indicated by the brief. These digital sketches began the digital process of ideation, where students tried out different layouts and fonts/types on their computer to see how they work with the chosen concepts. From this point forward, the processes became exclusively computer-human interaction. Images were then added and manipulated. Some of these images were downloaded from the Internet, alongside students’ own photographs taken at an attached photography studio, with friends as models. It is important to note that these processes took between seven days to arrive at the chosen solution to the problem.



**Plate 2: Picture of a lecturer discussing individual's work**

#### 4.2 Studio as the community of practice

One of the questions that drive this study was: **what happens when students develop ideas with ICT in current studio?** The idea that learning involves a deepening process of participation in a community is the focus at the studios. The aspect of learning in the model of activity theory posits that learning involves a process of engagement in a ‘community of practice’. Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. According to Wenger, not everything called a community is a community of practice. Rather it becomes community when there is a domain of interest; relationships that enable them to learn from each

other, help each other, and share information; and finally those who shared in practice [37].

In this study, the studio is captured as the community of practice where students and lecturers meet to learn from each other. Students were required to bring their initial thumbnails of pencil sketches and the digital sketches, to be discussed and critiqued by both lecturer and students at the studio. As Graham [38] emphasised, 'criticism is the main pedagogical method used in the design studio'. The studio revolves around teacher demonstrations, desk crits given to individual students by peers and teacher, and juries of final design solutions. 'Critiques in the studio also help students develop their own critical faculties by instilling the process of reflecting and reacting to design intentions, which lead to their design decisions, and then reacting to the consequences of each action' [38]. As a result of the size of the class and the settings, no meaningful studio interactions or feedbacks for such students took place during the juries (*item 5 and 6 in figure 5*). Students had less feedback from peers, since the majority of the students were seen concentrating on their own work in their sketchbooks and laptops. Apart from the lecturer moving to individual laptops, there were not enough critiques and interactions that helped the individual students from peers in their design decisions. Such activity created some distortions and disturbances as per the Bauhaus pedagogy, and as posit by the community of practice.

With proper ICT pedagogy with design education, such tensions and disturbances could be avoided. Reffat [39] proposes a virtual design studio (VDS) as an alternative to the traditional face-to-face, and which include lecture/studio sessions and group discussion. VDS allow students to bring multiple perspectives, diverse backgrounds, learning styles, experiences and aspirations into a studio, where due to large numbers, interaction is difficult. VDS also foster collaborative learning especially where there is a structure that encourages student conversation and communication [39]. With such collaborations, students using ICT as mediating tools will be able to transfer their ideas into objects that will eventually achieve their outcomes of creative works (*item 2 in figure 5*). Such interactions will still have to be achieved within the set of rules of design principles, even though students will still be working within the virtual studios of community of practice. The community of practice will not only embrace peers and educators, but also real life situations outside the schools physical studios, with perhaps, professional designers whose works will serve as sources of inspiration. Within such scope, educators' interactions will be possible with the model within the virtual design studio. According to Issroff and Scanlon [40], 'activities are not isolated units, but nodes in crossing hierarchies and networks which are influenced by other activities'.

### **4.3 Activity within ideation process with rules and the object**

A major focus of the study area was **what happens when students begin to go through ideation with ICT, in their design process**. Bender [5] identified four conditions for effective studio work in the design process as it relates to design education. These conditions are also corroborated by Schon - *The Traditional Studio Today* - and Kvan - *Kvan's Theories on Effective Online Studios* - [15]. These conditions are *learning by doing, one-to-one dialogue, collaboration and process-focus*; and these undoubtedly are critical pillars in the pedagogy of design education.

The introduction of ICT in this situation had shifted the design process into the digital domain. In the condition of *process-focus*, Bender [5] remarks that less emphasis is placed on the final evaluation of the outcome of design concept as students are taken through critical design processes that leads to knowledge base, not only on ideological considerations [41], but also through exploring imagination, documenting ideas and seeing how they are properly built [42]. The process-focus also forms the basic ideation process in the evolution of creative design and must be the focus of any design pedagogy.

In the reported study, when the final designs were viewed against the approved thumbnails that were digitised for refining, dramatic changes had occurred. Between the digitisation and the final stages of the ideation process, major changes with types/fonts, layouts and even with the choice of image and manipulations had occurred. Judging by the questions asked, lecturers seemed not to have trusted some students' capacity to execute their work, since the final designs showed some serious gaps in the flow of the thumbnail sketches. From ideation point, the changes gave the impression of a vigorous iterative ideation process (*item 3 in figure 5*), but there was no way ideation process was captured by the pedagogy. This created a distortion of the ideation pedagogy in design (*item 1 in figure 5*), which this study captured as the basis for the research. As one student remarked during a follow-up interview, it is possible for an idea to 'drop' at a latter stage of the ideation process. This might be the probable cause of the lecturer's lack of confidence in the students and the fact that there was no clear pedagogy that sought to interrogate and integrate ICT and ideation. This study advocates an exploration into the study of ideation pedagogy as it relates to ICT.

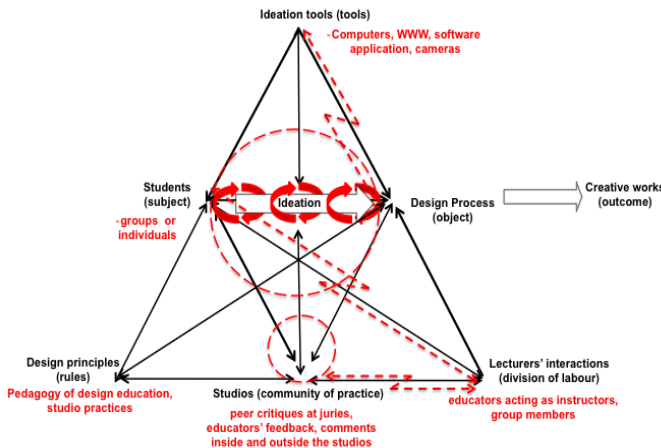
The exploration of imagination and documentation of ideas which do exist 'in the head' (Vygotsky 1982a in Kaptelinin & Nardi 2006), will now be possible, with ICT as tools of mediation as being conceptualised by activity theory in the diagram – by the horizontal movement from subject to the object. Such movement is referred to as "internalization" or "transition of an external operation into an internal one" (Vygotsky 1983 in [18]. According to Kaptelinin and Nardi [18],

*'in the process of internalization, some of the previously external processes can take place in the internal plane "in the head." It is not just an elimination of external processes but ... rather a redistribution of internal and external components within a function as a whole. The raison d'être for internal activities is their actual or potential impact on how the individual interacts with the world' and 'the impact can be made only through external activities' (p. 43).*

What made it easier for the condition of *process-focus* to be avoided here was lack of right pedagogy for the ideation process. Educators had difficulty in interacting to follow through the process and monitoring as a result of inadequate infrastructure support for ICT. Students no more focused on drawing and sketching as the only sources of capturing ideas. This was also an issue that distorted the ideation process, when the process moved into the digital domain. However, creative ideas can be captured through rational thinking, convergent and divergent thinking, heuristic thinking and even trial and error [44][45].

Educators will need to have exact pedagogy that regulates the ideation process with ICT. *Such pedagogy will allow students*

using ICT as mediating tools; transfer their ideas into objects that will eventually achieve their outcomes of creative works. Such interactions will still have to be achieved within the set of rules of design principles. Within such scope, educators' interactions will be possible with the model within VDS with ICT. With such interactions, the fear of not being able to follow through students' activity in the ideation process should be overcome within activity theory as lecturers can monitor and give feedbacks for the process of ideation (figure 6).



**Figure 6: Model of pedagogy of ICT with design in activity theory without the contradictions**

One of the criticisms against the use of ICT in design process of ideation is the fact that students do not follow through their sketches. These situations lead to a distortion where tools directly lead to the final outcome. Reffat [39] again proposes a design process in the digital domain where students will go through ideation digitally. He advocates a situation that allows students using digital tools, save their file whenever a revision is done, thereby providing a record of the past. This strategy will lead students through the evolution of their designs, from various concepts to design developments. The documentation of the design process in the form of a digital sketchbook ("digital portfolio") will broaden the students design universe to utilize the design tool, and to digitally merge design ideas created at different time intervals of the design process [39].

As students integrate with ICT in the virtual studio with the combination of instruction and construction, there is the need for right pedagogy in appropriate conditions by lecturers [46]. This will heightened and increased students' knowledgeable materials to arrive at solution. The process may or may not involve sketching or drawing on paper in the traditional sense, even though the desired result could have been achieved. This is possible with the advent of digital age, where image manipulation software and equipment like scanners has removed some of these difficulties. Moreover, it allows a more open definition of the purpose of drawing as it depicts the ideation process required in the design process. However, the traditional drawing concept of ideation is not seen here as this might move beyond a likeness of 'hand rendering' an object [47].

#### **4.4 Subject and the division of labour**

If educators are to progress with ICT in design education, students need to develop greater autonomy and confidence in their selection and use of information sources and tools. They are expected to develop into discerning users of ICT, with increasing awareness of the benefits and limitations of the

systems they use. They should be able to present their ideas in an increasing variety of ways with a developing sense of audience. In this way, their ability to evaluate their own work grows, and they become progressively more able, to discuss and appreciate issues as they reflect in their ideation process.

One of the key determinants of the success or lack of success of any educational initiative is the teacher, in this context the design educator. Educators need to change their traditional role in order to adapt to this age of rapidly developing technology [48]. The input and acceptance of educators in the use of digital technologies, especially in providing positive student learning, is a key factor.

There are a number of problem areas for educators in giving students a critical understanding of what ICT can do in design. Two issues easily come out with respect to ideation and ICT integration. These are the nature of educators' experiences as 'makers' of design themselves and the relationship between the designer and the tools with which he or she is working. These concerns may be unique to design teaching, where the practitioner's role and identity is both sensitive and particularly important. We see design educators as mostly trained as practitioners, but not as educators. They, therefore, have difficulty dealing with education in any other terms than those they have experienced [49]. In addition, for trained educators, their role as practitioners often dominates their instructional capacity. The introduction of ICT into the equation has proved problematic and upset delicate balances for many in the design teaching profession.

## **5. CONCLUSION**

There is conceptual confusion which manifests itself in looking backwards at what might be lost rather than forward at what might be gained [50] especially with ICT in ideation. While it is essential not to lose what is the core of the graphic design curriculum, there is a sense in which the oft-repeated statement that we are judging a new technology by old understandings seems to be very accurate at present [50]. It is possible that a greater opportunity will be missed if too much emphasis is placed on preserving particular processes - as if they are the most important aspect of learning. Research into educators' role in the pedagogy is critical as we try to embrace ICT in the graphic design curricula, with the assumption that teaching and learning of ideation and design process in graphic design will become more effective, with the visual understanding of graphic design students developing and extending as we use ICT. Educators can now follow and monitor students' activity of the ideation process in classes with larger numbers. Feedback and engagement with the community of practice - a situation that underpins the Bauhaus concept - will eventually enhances constructivism of learning, as with graphic design pedagogy. Educators will then play positively, their role as actors in the division of labour.

The attempt to use activity theory in analysing the current challenges in the pedagogy of ideation in graphic design is reviewed in this paper. We have highlighted the distortions, disturbances and tensions confronting the current pedagogy with large classes, by the introduction of ICT in graphic design education due to unavailability of informed pedagogy for ideation. We have suggested the use of activity theory as a lens for ICT integration with clear pedagogy - as a means of coping with problems such as context, situation and practice - in dealing with the challenges. There is no doubt that there may be other fundamental issues that need to be confronted in terms of the pedagogy, especially when it comes to the use of ICT in the

developing world. We believe that graphic design educators in the developing world will have to realise the paradigm shift in the pedagogy of graphic design, especially with the emergence of ICT in the equation and make necessary efforts in overcoming these challenges. It is possible that greater opportunity is being missed if too much emphasis is placed on preserving particular processes or materials, especially now that classes are becoming larger and larger.

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