

# Flipped Classroom Model as an Instructional Tool for Effective Teaching and Learning of Leatherwork

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## Abstract

Students found in Senior High Schools located in the cities are faced with the difficulty of not having any foreknowledge on most of the practices involved in either obtaining a pelt or its treatment. This is largely due to the fact that treated leather is exposed to the leather work students in the cities. As such, the students are not previewed to the production processes of leather. Owing to this, leather work teachers in the city are also seriously challenged in getting to build on student's relevant previous knowledge. In order to use the Flipped Classroom model salvage this difficulty, we adopted both qualitative and quantitative research methods and instruments to elicit the needed data from a target population of 55 respondents comprising one head of Visual Arts Department, 2 Leatherwork teachers and 52 second year students with interview, observation, and questionnaire administration to examine teaching and learning of leather work in a selected public Senior High Schools in Kumasi metropolis. It was revealed that the flipped classroom model facilitates communication between the teachers and students and aided in the provision of an easy access to information which has sort to promote the use of data and real-world applications to enhance the teaching of theoretical and new lessons. This has also aided in the provision of an easy access to information which has sort to promote the use of data and real-world applications to enhance the teaching of theoretical and new lessons. The results of this study suggest beneficial effects of implementing the flipped classroom model for the teaching of all practically related art subjects.

**Keywords:** Teaching; Learning; Flipped Classroom Model; Instructional Tool; Leatherwork.

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## 1. Introduction

Teaching and learning of leather work in Ghana's Senior High Schools are steered by a consolidated curriculum, teaching syllabus, assessment criteria and examinations at the end of the three-year training, yet discrepancies exist among students found in the cities and those in rural areas in sectors of understanding and explaining, whenever they are asked to answer questions on some basic leather work topics. Personal experience as a leather works teacher in both areas reveals that urban students lack relevant previous knowledge of basic but relevant practices because of non-exposure. It was clear that they do not have any foreknowledge as to how most of the practices involved in either obtaining a pelt or its treatment are done. The Leatherwork students are not exposed to the preparatory processes of transforming the skins and hides of animals into leather. It was observed that about 80% of the students were born, bred and stays in the city and as such are only familiar with artificial or already treated pelt. As a result of their non-exposure, they could hardly describe or give examples of tools used nor give a detailed description of the processes for acquiring the pelt and its treatment to becoming leather. Neither are they also able to easily understand some production processes like carving in leather work since it is not commonly practiced in the country.

However, one of the relevant tools for effective teaching is the teacher's focusing on the previous relevant knowledge of their student. Learning is supposed to be from the known to the unknown, so that new knowledge to be acquired can rest on a good foundation. As opined by the constructivism learning theory, the learner actively constructs or creates their own subjective representations of objective reality and new information is linked to prior knowledge [3]. Even though culture is dynamic, these urban students seems not have ample knowledge on "*what was*" and "*what is*". As such, it becomes very difficult for teachers to locate student's relevant previous knowledge in order to build on. Teachers are left with no other option than to end up lecturing whilst students also memorize without understanding which also ends up making teaching and learning ineffective.

### 1.1. Teaching and Learning

According to [28], one of the most powerful agents which provides mental, physical, ideological and moral preparation to individuals, making them fully aware of their purpose in life and to assist them towards their achievement is education. As such, it could be seen as one of the most powerful tools for reducing poverty and inequality among the citizenry. It is widely accepted that the quality of education depends on the quality of the teacher because the teacher does not depend on the learner any more than the learner depending on the teacher. Teaching unlike other occupations cannot be undertaken anyhow because it is always directed towards the learner and it is a complex, multidimensional task, often requiring teachers to juggle multiple tasks and goals simultaneously and flexibly [2]. In addition, [25] postulates that teaching is not like a "one-size-fits-all socks" because of individual differences, but rather teachers must master a variety of perspectives and strategies and be flexible in their application to help promote learning.

Learning as described by [25] comes from experience and has a permanent influence on the way we act, what we know and how we think. According to him, we inherit some abilities, which are inborn or innate such as how

to swallow food or how to sleep but not everything we know is learned. Hence, any knowledge that comes by is to increase the innate ones. Therefore, the teacher possesses the sole responsibility of guiding the learner to gradually go through each of the learning stages in an efficient manner, and focusing on their motivation, involvement, and readiness in classroom situations [9]. The teacher is therefore required to actively involve the learner for a direct influence on the development of his intellect and to also arouse their enthusiasm and concern. This is supported by the constructivist theory which says that what is already known must be tied up and re-worked as new information comes along.

### ***1.2 The Flipped Classroom Model***

[16] are of the view that the flipped classroom model is a pedagogy which provides teachers the opportunity to move the face to face learning out of the large group learning space and move it into the individual learning space, with the help of technology. Teachers record and narrate screen-casts of work they do on their computer desktops, create videos of themselves teaching, or download video lessons from internet sites. These videos are then forward to students to access whenever and wherever it is convenient, as many times as they like, enabling them to come to class having a prior knowledge of the lesson to be taught [22]. The teacher then capitalizes on the students' early preparation and devotes classroom meetings with the students on incorporating and applying their knowledge, via a variety of student-centered, active learning strategies such as conducting research or working on projects with classmates. As such students become the agents of their own learning.

The Flipped Learning model can enable teachers have ample time to attend to the needs of individual students. However, the key pillars of flipped classrooms which facilitates learning are Flexible Environment, Learning Culture, Intentional Content, and Professional Educator as identified by a cadre of experienced educators from the Flipped Learning Network. The flipped classroom model has a strong dependence on technical resources such as internet, computers, tablets or cell phones with which the flipped learning experience is delivered. These tools need to be reliable, easy to use, and up to date, for them to have a meaningful impact on the learning experience.

The dynamic nature of culture coupled with the advent of technology has resulted in the creation of today's digital world and kids born in this era are referred to as "Digital Natives" simply because of the long hours they spend using these tools for other purposes. As a result of this behavior, he is of the view that they would also digest educational content in this manner as well. However, the majority of high schools in the country do not have properly furnished ICT laboratory in their schools, those who have, have issues with internet connectivity. What even worsens this situation is the strict restriction on students on the use of such electronic gadgets.

Again, there is the concern that since flipped classrooms are dependent on student participation, one must trust students to watch the lectures at home. Unfortunately, there is no way to guarantee students will cooperate, however, if proper measures for accessing students on the video instituted before classes begin, then each student will be obliged to find his or her own means to watch the video. Moreover, there are concerns that implementing a flipped classroom adds an additional workload on teachers. However, since teaching is not complete until learners have understood the subject matter, it is worth every pain that the teacher has to endure

in order to achieve his set target. One may argue that the introduction of the flipped classroom model has the potential to cause serious problems to students' learning processes, as not everyone learns best through a screen. However, if this comes to stay and becomes the order of the day, students will definitely adjust to the new trend and they even have a better advantage of discussing whatever they did not understand with the teacher in class.

### ***1.3 Instructional media***

According to [26], the term "instructional media" consist of all the materials and physical means which an instructor might use to deliver his instructions and automatically aim at helping the instructor to achieve his/her instructional objectives. This may consist of a variety of locally known materials such as chalkboards, handouts, charts, slides, overheads, real objects, and videotape or film, as well newer materials and methods such as computers, DVDs, CD-ROMs, the Internet, and interactive video conferencing. It can also be in the form of hardware like blackboards, radio, television, tape recorders, videotapes, recorders and projectors; and, software like transparencies, films, slides, teacher-made diagrams, real objects, cartoons, models, maps and photographs [23].

Even though the instructional media are very effective facilitators in the education set up, they cannot be used in place of the instructor. Visual media are primarily for seeing, audio devices for hearing, and multi-sensory materials for use via two or more senses. In other words, the differences in the makeup instructional media have their own way of affecting the different senses and act as an integral part of teaching and learning process and thus help to bring about meaningful experiences.

### ***1.4 Learning Theories***

Learning theories raise questions such as how does learning happen? What does it entail? What influences students' development? Learning theorists use diverse terms to explain how people learn. This helps to provide a more holistic view of learning [13]. However, [4] contends that there are three main viewpoints of learning theories and these are a behaviourist, constructivist and cognitive. The behaviourists view of learning is that learning takes place when there is a change in one's behaviour and the purpose of the learning is to produce a behavioural change in the desired direction [15]. Behaviourism concerns itself solely with measurable and observable data and excludes explicit ideas, emotions, and the consideration of inner mental experiences and activities and is not interested in conscious control processes [8]. The theory also considers learning as the modification of behaviour brought about by experience [18]. One important focus of this theory as postulated by [18] is the use of positive or negative reinforcements by instructors to gradually shape learners' behaviour. In this theory, the learners observe the information, practice the information, and then receive reinforcement through praise [24].

The behaviourists consider rewards and punishments, or at least the withholding of rewards, as powerful ways of forming or extinguishing habits [18]. Praise may be part of such a reward system. The teacher's role is, therefore, to organize the environment in such a way as to be able to elicit the desired responses and to also assess this to ascertain whether all students have achieved the desired responses. The learning tasks are designed

to be reliable and challenging to motivate students. Multiple viewpoints are encouraged, and students can discuss and debate their opinions. [27] states that the application of the behaviourist theory in the classroom is usually considered as explicit or direct instruction. Although this approach has been criticized within general education, it had shown promising research results, particularly for children with learning problems.

#### ***1.4.1 The Constructivist Theory of Learning***

According to constructivism, learning is the way by which the learner inwardly builds his/her knowledge [4]. The theory argues that learners actively construct structures of understanding (cognitive schema) by using what they already know in addition to the new information that is presented to them. It describes learning due to the construction of knowledge and focuses on the understanding of the information. The argument is that learning is primarily concerned with how people develop different conceptions and constructions of reality [17]. Learning is considered as a restoration rather than a transmission of knowledge which means learners assimilate new information and modify their understanding in the light of new data [8]. In constructivism, learners actively construct their understanding based on their prior experiences and existing knowledge structures [4]. In constructivist education, the teacher designs learning activities to engage students in active problem solving and genuine inquiry. With reference to the learner, learning conditions are both external and internal.

For learning to become very effective, the constructivist theory says what is already known must be tied up and re-worked as new information comes along. [20] add that the constructivist learning is an interactive process. Therefore, the quality of teaching and learning depends on communication based on mutual understanding. In the nutshell, Constructivism is the process of teaching with an approach that seeks opportunities for students to analyze, investigate, collaborate, share, build and generate based on what they already know. The role of the teacher is didactic and well-established and the learning that is captured within a constructivist environment is student-centred and collaborative. Here the teacher is seen as the coach. To do this effectively, the teacher needs to be a learner and a researcher, giving teachers the opportunity to work as a learner helps them overcome anxieties about novel situations [14].

#### ***1.4.2 Connectivism***

According to Siemens, the first point of learning where knowledge is activated through the process of learners connecting and feeding information into a learning community is connective. The community is the gathering of similar areas of interest that permits for interaction, sharing and thinking together [19]. Information is disseminated through an information network. Connectivism learning theory, properly applied, has the potential to improve education through the revision of educational perspectives and generate a shift toward learner-centred education. The theory allows for instructors to step back from controlling course content and bypass textbooks and rather focus all efforts on learners so that they can be locating, presenting and making sense of relevant knowledge. By so doing, the challenge of the instructor being the repository of knowledge is reduced. Knowledge is no longer expert-centred and as a result learning can occur for all classroom participants even including the instructor [6].

## **2. Methodology**

The researchers utilized the mixed methods approach for the study. [5] avers that the mixed methods research design is a procedure for collecting, analyzing, and mixing both quantitative and qualitative research and methods in a single study to understand a research problem. This kind of research involves using multiple concepts, methods to answer research questions instead of limiting the researchers to a particular research method. This means the combination of qualitative and quantitative research paradigms has a high tendency to achieve both in-depth and insider perspective of the phenomenon under study, as well as quantification of variables to provide answers to the research questions.

Descriptive and Action research methods were used for driving the study. Reference [29] explains that the descriptive research systematically documents current events, lasting products or other phenomena that can be measured directly by researchers today. Descriptive statistics (mean, median, range, variance, and standard deviation) are used to summarize and give the order to the measurements made in descriptive research. The descriptive research method was found appropriate because it provided systematic information about a phenomenon and allows for the quantification of variables to provide answers to the research questions. On the other hand, Action research is a research based on the researcher's working environment aimed ultimately at impacting change to improve working conditions for the better [12]. The researchers adopted this research method because they wanted to improve the teaching and learning processes in Leatherwork using the flipped classroom model.

In this study, the researchers acted variously in the role of complete observer and participant-as-observer. The role of complete observer helped the researchers to collect data on the facilities available, the nature of the study area and teachers as they delivered their service. In this study, the participant-as-observer method was used to gather primary data from students. This involved giving an initial introduction and inspirational talk on the reasons for the research and how the students were to answer the questionnaire. The talk was done to motivate the students and to assure them of the confidentiality of the data they would give. This psychological orientation was kept very brief to prevent boredom. To determine the validity, reliability and usability of data gathered via observation, five copies of the checklist were given to colleagues for study, correction and suggestions for improvement. Aside from observation, the researchers implemented questionnaire and personal interview that was semi-structured with both open-ended and close-ended questions. These data collecting procedures used together with the observation formed a form of triangulation that increased the validity, improved the data generated and yielded thick data about the phenomenon studied by the researchers [11].

A multi-level sampling procedure of purposive and convenience sampling techniques was adopted for the selection of the sample from a total population of 137 respondents. The purposive sampling technique was employed to select Serwaa Nyarko Girls Senior High School and the first year group of leather work students for the study. As the name suggests, purposive sampling is where people or a unit of the population is chosen for study based on a purpose [21]. The main factors that informed the use of this sampling technique were:

- A school in Kumasi Metropolis where leather works is taught

- A school which has an ICT laboratory with an internet facility
- A year group which has recently gone through the foundation for Leatherwork education

As such, the purposive sampling technique was adopted to select SENGSHS and their second year group of students because it is deemed that the year group where the foundation for Leatherwork education has been recently laid. As such, it is easy for them to remember and identify topics which they had difficulty in understanding. After that, convenience sampling was then used for the final selection. Convenience sampling is a non-probability sampling technique where subjects are selected because of the ease of their volunteering or selecting units because of their availability or easy access. The convenience sampling was used in selecting SENGSHS because of proximity and easy access to data. The researchers happen to teach in the selected school and as such data gathering and acquisition of facilities will be easily accessible. Finally, 55 respondents that consisted of one head of Visual Arts Department, 2 Leatherwork teachers and 52 second year students from a total population of 137. All 52 students answered a questionnaire that comprised close and open-ended items while the two (2) teachers and head of Visual Art Department were interviewed. The 52 copies of questionnaire administered to the students had a 100 % return rate due to their small number.

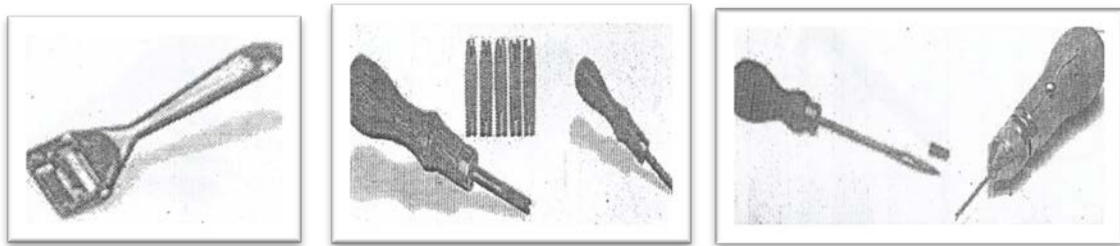
### **2.1 The Study Area**

The selected school has a population of 1,860 students with 137 of them studying Visual Arts. Other programmes being offered include Science, General Arts, Home Economics and Business Studies. This is a single sex school with boarding facilities but there are other students living in hostel facilities because of their infrastructural difficulty. The school is enclosed with a secured fence wall. It has a well-structured art studio with tables and benches. However, because the studio was a classroom that has been converted, it is not spacious enough to contain many students at a time. The school is also dedicated to training disciplined students because it attaches great importance to promoting religious diversity as students of different religious denominations are admitted. General Knowledge as a common elective and each student has to choose between Picture Making and Graphic Design for their two dimensional elective and Leather works as the three dimensional elective. It also has a well-equipped and a spacious ICT lab with an internet facility. Students are given the opportunity to visit the ICT lab any time they have ICT on their time table.

### **3. Results and Discussions**

The interview with the teachers revealed that of the 18 topics which are supposed to be taught in the first year, they had difficulty in teaching 4 of them. They attributed this difficulty to the lack of a well-equipped studio, inadequate funds to purchase all needed tools and materials and the tightly packed nature of the time-table and the academic calendar making it very difficult to even embark on field trips or carry out more practical lessons. These topics were: Identification and Preparation of Leatherwork Tools, Leather-Raw Materials and Preparation, Design Process and Leather Decoration. Out of the 52 retrieved questionnaire from all the students sampled, it was revealed that of the 18 topics which are supposed to be taught in the first year, 9 of them were very difficult for them to understand. These topics included: Identification and Preparation of Leatherwork Tools, Leather-Raw Materials and Preparation Other Leatherwork Materials, Preliminary Design Unit, Design

Process, Making Leather Items, Leather Decoration, Leather Finishing, Developing a Business Plan and Business Brochure and Card. This difficulty according to the students were ascribed to the fact that the majority of the tools and production processes were not shown to them and even the images of those in their books were not visible enough for easy identification. Moreover, they did not have the opportunity to visit any pelt treatment site or leather work production industry to have a feel of what actually happens there. Also, time allotted for leather work is too short that they at times had to end midway into a practical lesson and make way for the next lesson. Sample images of tools in their text book are as shown below.



**Figure 1:** Using the flipped classroom model as an instructional media for teaching the identified topics  
(Source: (1), p. 36)

Findings on the use of the flipped classroom model as an instructional media for teaching were grouped under three stages which are the Pre-introductory stage, introductory stage and the Post-introductory stage. However, because of time constraints only the four topics which the teachers had difficulty in teaching and also formed part of the lessons student's had difficulty in understanding were considered.

### 3.1 Pre-introductory Stage

In this stage, scores of already marked the works of student on the four selected topics were recorded and tabulated as shown in table 1.1 and 1.2 below.

**Table 1.1**

LEATHERWORK TOOLS			PELT PREPARATION		
BEFORE			AFTER		
RANGE OF SCORES ATTAINED BY STUDENTS	NUMBER OF STUDENTS	PERCENTAGE (%) OF STUDENTS	RANGE OF SCORES ATTAINED BY STUDENTS	NUMBER OF STUDENTS	PERCENTAGE (%) OF STUDENTS
8 - 10	8	15	8 - 10	3	6
5 - 7	11	21	5 - 7	6	23
BELOW 5	33	64	BELOW 5	37	71
TOTAL	52	100	TOTAL	52	100



**Table 1.2**

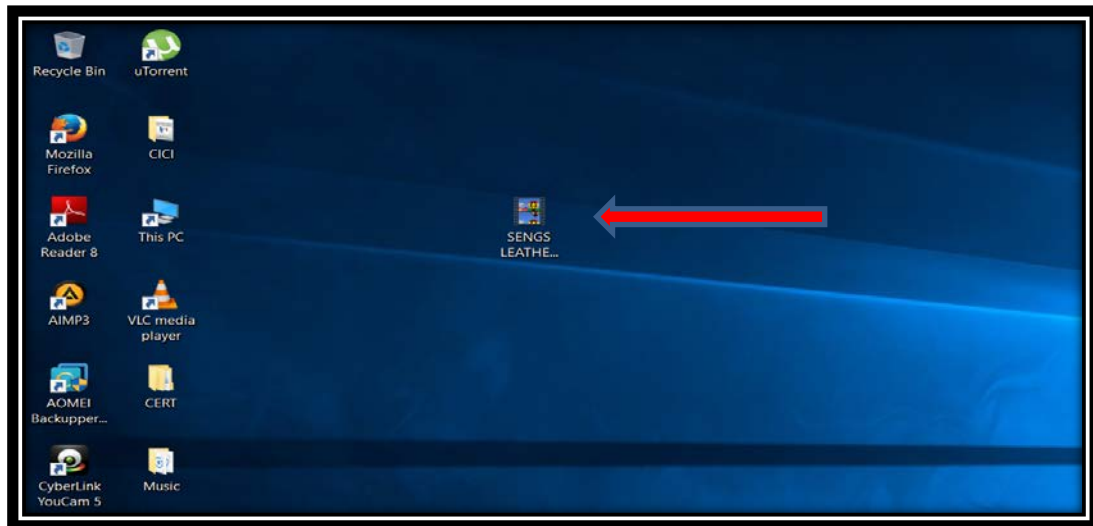
<b>DESIGN PROCESS</b>			<b>LEATHER DECORATION</b>		
<b>BEFORE</b>			<b>AFTER</b>		
<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>	<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>
<b>8 – 10</b>	0	0	<b>8 – 10</b>	3	6
<b>5 – 7</b>	18	35	<b>5 – 7</b>	6	11
<b>BELOW 5</b>	34	65	<b>BELOW 5</b>	43	83
<b>TOTAL</b>	52	100	<b>TOTAL</b>	52	100

*Source: Survey Data, 2016/2017*

Tables 1.1 and 1.2 above shows that the majority of the students indeed has difficulty understanding the four selected subjects. This is evident as majority of the students scored below the average mark with 64% as against 36% in Leatherwork tools, 71% as against 29% in pelt preparation, 65% against 35% for design process and 83% as against 17% for leather decoration. It could be deduced from this finding that the low performance is as a result of the nature and teaching method which was used in the lesson delivery, as such, there is the need for an intervention or extra class requiring extra energy and effort. This concurs with the assertion by Progress Educate, 2012 that since students are made to sit passively while the teacher delivers a lecture in the brick and mortar classroom setting, and their focus is set in the wrong direction; in taking notes rather than understanding and absorbing new concepts. As such, students are unable to grasp key ideas and concepts upon which further lessons are based. Hence, students are normally faced with the problem of low performance and having to spend additional monies on extra classes.

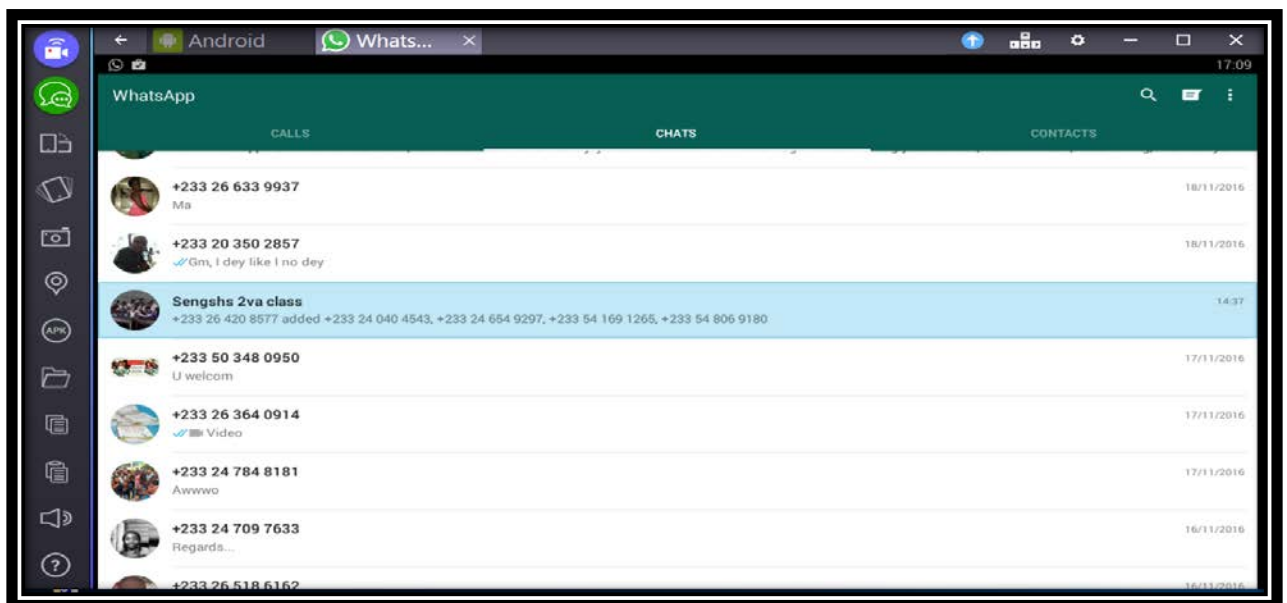
### **3.2 Introductory Stage**

Prior notice and arrangements were done with the head of Visual Arts Department and his leather work teachers to allow the research a period of four weeks to use the flipped classroom model as an instructional media for teaching the identified topics. Also, because the students are not allowed to use mobile phones and do not have access to the school's computers in the computer laboratory on weekends, arrangements were made with the head of department for I.C.T. to help the boarders have access to the computer laboratory for one hour on every Saturday. As such, the videos on the lesson to be taught in each week was downloaded from the internet and uploaded unto all the desktop computers in the computer laboratory a week earlier so that students could also watch before lessons begin on the following week. Fig.2 shows a sample of the video icon which was created on the desktops to contain the videos.



**Figure 2:** Video Icons (Source: Designed by Researchers)

Again, because day students could easily have access to android mobile phones and/or could also visit the internet Café's, a Whatsapp group page was created with them so that they could watch posted videos, or visit to see web site addresses of videos and pictures on topics to be treated before coming to class the following week. Fig. 3 shows the group chat page created on the Whatsapp.



**Figure 3:** Sample of Group Chat (Source: Photographed by Researchers)

In addition, day students with pen drives were given soft copies of videos to be watched over the weekend so that they could equally be fully prepared for discussions on the subsequent week. However, those who had access to android phones had the videos and website addresses posted on the Whatsapp page. Fig. 4, Fig. 5, Fig. 6, Fig. 7 and Fig. 8 show website addresses and videos as posted on the page for the day students to watch and also visit for further information.

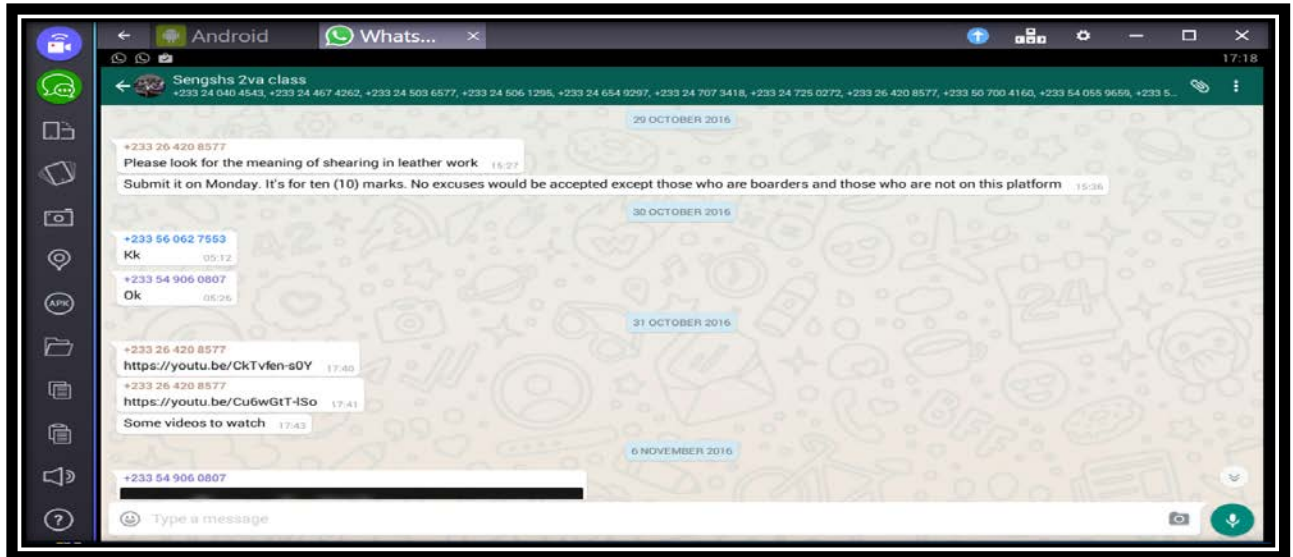


Figure 4: Website Addresses and Videos Posted on Group Chat (Source: Photographed by Researchers)

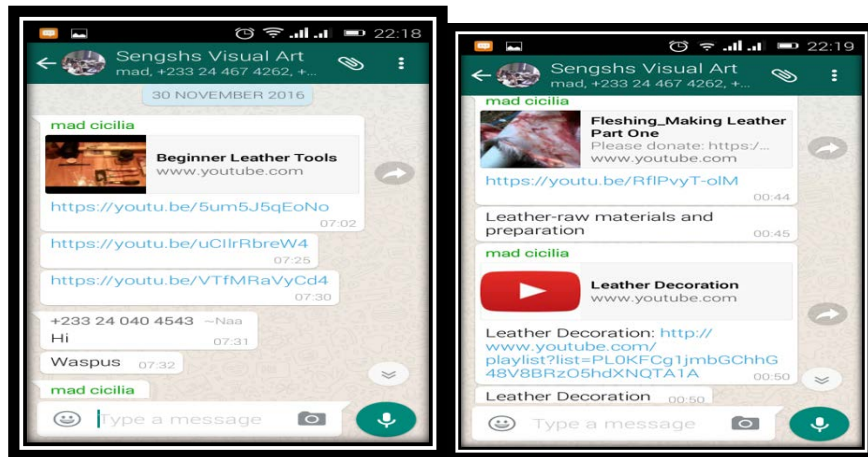


Figure 5 & Figure 6: Website Addresses and Videos Posted on Group Chat (Source: Photographed by Researchers)

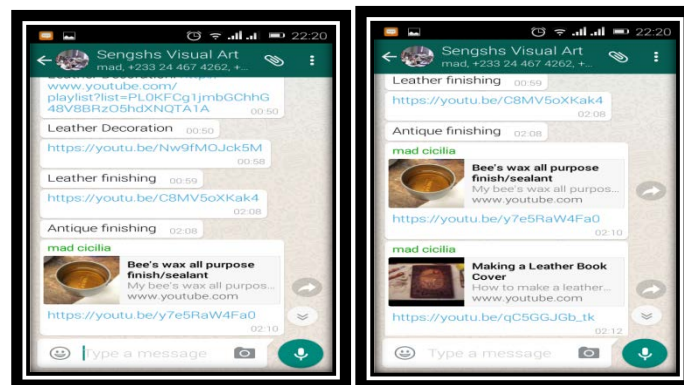


Figure 7 & Figure 8: Website Addresses and Videos Posted on Group Chat (Source: Photographed by Researchers)

In addition, Fig. 9 and Fig. 10 below also shows how the boarders were assisted as they visited the lab on one of the weekends to watch the uploaded videos on the desktops and some laptops in the computer lab.



**Figure 9 & Figure 10:** Students Assisted to Assess Uploaded Videos on a Weekend (Source: Photographed by Researchers)

### ***3.3 Post-introductory Stage***

This stage deals with the classroom interaction between teachers and students. In this stage it was observed that week after week, the students prepared themselves adequately for the lessons by watching the videos. This promoted a cordial teacher-student interaction and teaching was more of a discussion than lecture. Teacher normally asked students to narrate orally or produce a written report of what they watched. As a result, it was realized that teachers could easily explain the topic to the understanding of all without much difficulty and the majority of them were willing to contribute in classroom discussions. In the nutshell, it was revealed that teacher's capitalizes on the students' early preparation and devoted classroom meetings with the students on integrating and applying their knowledge, via a variety of student-centered approach. Fig. 11 shows how co-operative students were in the classroom during lesson periods.



**Figure 11:** Active Class Participation as a result of the application of Flipped Classroom Model (Source: Photographed by Researchers)

To validate the findings from what was observed, the teachers were also asked about their views on the introduction of the flipped classroom course model in their classroom. It was revealed that they truly liked the model and wished it could be sustained and were very pleased with its ability to make students contribute in class discussions. Moreover, the teachers also said it made the class so interesting that student who at times skipped classes began to attend classes. In addition, the head of department and other visual art teachers attested to the efficacy of this course model and begun to look for means through which they could adopt and use it in the teaching of the other visual Art subjects taught in the school.

### ***3.4 Assessing the Efficacy of Using the Flipped Classroom Model to Deploy Instructions and Enhance Student Learning***

In this stage, scores of marked exercise works of student on the same exercises given them and recorded earlier in the pre-introductory stage for all four selected topics were recorded, tabulated and compared as shown in table 1.3, 1.4, 1.5 and 1.6 below. 'Before' is used to represent the scores obtained by the students before the introduction of the flipped classroom model and 'After' to represent the scores gained by students after the application of the flipped classroom model in the teaching and learning process.

**Table 1.3**

<b>LEATHERWORK TOOLS</b>			<b>LEATHERWORK TOOLS</b>		
<b>BEFORE</b>			<b>AFTER</b>		
<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>	<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>
<b>8 – 10</b>	8	15	<b>8 - 10</b>	42	81
<b>5 – 7</b>	11	21	<b>5 - 7</b>	8	15
<b>Below 5</b>	33	64	<b>Below 5</b>	2	4
<b>TOTAL</b>	52	100	<b>TOTAL</b>	52	100

***Source: Survey Data, 2016/2017***

Table 1.3 above, it is evident that before the introduction of the flipped classroom model, 64% of the students scored below 5 marks while 36% of the students scored above 5 marks.

However, after the introduction of the flipped classroom model, only 4% of the students scored below 5 marks, whereas 96% of the students scored above 5 marks.

This is a clear indication that the flipped classroom model is very efficient in deploying instructions for leather work education.

**Table 1.4**

<b>PELT PREPARATION</b>			<b>PELT PREPARATION</b>		
<b>BEFORE</b>			<b>AFTER</b>		
<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>	<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>
<b>8 – 10</b>	3	6	<b>8 - 10</b>	39	75
<b>5 – 7</b>	12	23	<b>5 - 7</b>	13	25
<b>Below 5</b>	37	71	<b>Below 5</b>	0	0
<b>TOTAL</b>	52	100	<b>TOTAL</b>	52	100

*Source: Survey Data, 2016/2017*

From table 1.4 above, it is evident that before the introduction of the flipped classroom model, 71% of the students scored below 5 marks while 29% of the students scored above 5 marks. However, after the introduction of the flipped classroom model, none of the students scored below 5 marks, which is a 100% score. This also shows that the flipped classroom model is one of the very efficient means of deploying instructions for leather work education.

**Table 1.5**

<b>DESIGN PROCESS</b>			<b>DESIGN PROCESS</b>		
<b>BEFORE</b>			<b>AFTER</b>		
<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>	<b>RANGE OF SCORES ATTAINED BY STUDENTS</b>	<b>NUMBER OF STUDENTS</b>	<b>PERCENTAGE (%) OF STUDENTS</b>
<b>8 - 10</b>	0	0	<b>8 – 10</b>	28	54
<b>5 - 7</b>	18	35	<b>5 – 7</b>	1	36
<b>BELOW 5</b>	34	65	<b>BELOW 5</b>	5	10
<b>TOTAL</b>	52	100	<b>TOTAL</b>	52	100

*Source: Survey Data, 2016/2017*

It is evident from table 1.5 above that before the introduction of the flipped classroom model, 65% of the students scored below 5 marks while 35% of the students scored above 5 marks. However, after the introduction of the flipped classroom model, only 10% of the students scored below 5 marks, whereas 90% of

the students scored above 5 marks. This also indicates that the flipped classroom model is very efficient tool in deploying instructions for leather work education.

**Table 1.6**

LEATHER DECORATION			LEATHER DECORATION		
BEFORE			AFTER		
RANGE OF SCORES ATTAINED BY STUDENTS	NUMBER OF STUDENTS	PERCENTAGE (%) OF STUDENTS	RANGE OF SCORES ATTAINED BY STUDENTS	NUMBER OF STUDENTS	PERCENTAGE (%) OF STUDENTS
8 - 10	3	0	8 – 10	31	60
5 - 7	6	35	5 – 7	9	17
BELOW 5	43	65	BELOW 5	12	23
TOTAL	52	100	TOTAL	52	100

Looking at Table 1.6 above, it is evident that before the introduction of the flipped classroom model, 65% of the students scored below 5 marks while 35% of the students scored above 5 marks. However, after the introduction of the flipped classroom model it was revealed that 23% of the students scored below 5 marks, whereas 96% of the students scored above 5 marks. This revelation proves that because the flipped classroom model enables students to come to class better prepared for teachers to capitalize on their earlier preparation by devoting classroom meetings on integrating and applying their knowledge, via a variety of student-centered, active learning strategies as postulated by [22]. It is that which has led to the improvement in the student's performance and clearly indicating the flipped classroom model is a very efficient means for deploying instructions for leather work education.

### **3.5 Challenges Encountered**

The selected teachers for the study attested to the fact that even though the flipped classroom model was very effective in the teaching of leather works, its implementation comes along with an extra duty. It was revealed that they had to spend extra time searching for the right videos which carried out their subject matter of their lessons, had to wait to download and upload unto the desktops and laptops in the ICT lab and finally, had to be present and monitor the students as they use the ICT lab on weekends which they could have also used that time to attend to personal schedules or rest coupled with marking of scripts and preparation of lesson plans.

Moreover, even though teachers in the selected school have access to internet facility, they lamented that the network was not very stable and as such made downloading very difficult. They normally end up going out to purchase credits in order to be able to do every download. As a result, even though they liked the model, it was

creating an extra cost to them and wished something could be done about their network. Moreover, the day students also revealed that they were also faced with a similar problem of having to convince their parents for extra monies to either visit the internet café or buy credit unto their phones before getting access to the videos.

Also, on two separate occasions during the course of watching the videos in the ICT lab with the borders, the power went off. This interruption truly disturbed the class since there was neither generator to refuel the computers nor enough UPS to support all the computers available. This was a major challenge because we were time bound. As such, the researchers and the students had to wait until the power came back for us to continue watching the videos which affected other programs for those days.

#### **4. Conclusion and Recommendations**

Although the study was done on a small scale, the data presented points to the fact that the flipped classroom model as used in this study has proven to facilitate communication between the teachers and students. This has also aided in the provision of an easy access to information which has sort to promote the use of data and real-world applications to enhance the teaching of theoretical and new lessons. This model, which is seen to use the internet, also provided a real increase in the quality of students' education on the use of the internet. The results of this study suggest beneficial effects of implementing the flipped classroom model for the teaching of all practically related art subjects.

Owing to the challenges and conclusions drawn from the research, it is recommended that the Ghana Education Service in collaboration with other education stakeholders should enact laws which will seek to allow students to use electronic gadget such as mobile phones, tablets and laptops in school to aid in their education. However, their use should be regulated. They should also see to it that the schools are provided with generators to help augment their power supply. To enhance a successful teaching and learning with an internet based model like flipped classroom model, the school's administration and stakeholders could go into partnership with a private Internet service provider to support in the provision of internet and the internet should be made accessible to students. Given the volatile and ever-changing nature of modern technology further studies should be done to keep up with the new technologies that will show up in the future simply because of the great contribution exhibited by the introduction flipped classroom model in the teaching and learning of leather work.

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