Towards an Inclusive Pedagogy: Applying the Universal Design for Learning in an Introduction to History of Global Art Course in Ghana

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Abstract

This convergent parallel mixed methods study was aimed at addressing the lack of empirical studies in the implementation of Universal Design for Learning (UDL) as an inclusive pedagogy in the Ghanaian higher education context. The overarching objective was to find out whether UDL has the potential in improving the learning processes and learning outcomes of the diverse students reading a History of Global Art course. Quantitative and qualitative data sets were garnered from 122 conveniently sampled students using an adapted version of the Inclusive Teaching Strategies Inventory-Students (ITSI-S) survey instrument. The findings of the study revealed that the UDL principles of multiple means of representation, multiple means of engagement and multiple means of action and expression impacted positively on students' learning processes and outcomes. UDL assisted greatly in the development of collaborative, problem-solving, good time management and critical thinking skills, while increasing learners' level of motivation. The study contends that though the UDL as an inclusive pedagogical approach requires a lot of dedication on the part of the instructor as well as a great deal of time and material resources, the accrued benefits of its implementation on the students' learning processes and learning outcomes are far-reaching.

Introduction

Inclusive pedagogy is an approach aimed at acknowledging and factoring students' differences into the teaching and learning classroom practice (Florian & Black-Hawkins, 2011). It places premium on the co-creation of knowledge in a constructivist approach (Ishmailov & Chiu, 2022) with teachers working alongside students (Grier-Reed & Williams-Wengerd, 2018). This approach is contrary to the traditional teacher-centered approach where the teacher transmits knowledge via what Ismailov and Chiu (2022, p. 4) refer to as "monologic lectures". Inclusive pedagogies have been empirically proven to cater for the diverse needs and expectations of students (Moriña et al., 2020; Zhao et al., 2021). Equity and inclusiveness for all students in the higher education context in Ghana have been a far-reaching goal yet to be achieved (Atuahene & Owusu-Ansah, 2013; Swanzy et al., 2019; Tudzi et al., 2021). There is a high level of diversity in the Ghanaian higher education institutional context caused by variance in the students' spiritual, religious, linguistic, cultural, gender and class background (Dei & Asgharzadeh, 2005). The ever-increasing and diverse learning populations in higher education institutions, as is the case of Ghana, require a good instructional design that can transform the learning experiences of all students (Pace, 2015).

One of the recommended inclusive pedagogies for assisting students with diverse backgrounds in classrooms at various education levels is the Universal Design for Learning (UDL) (Burgstahler, 2021; Capp, 2017). The UDL aims at eliminating all potential barriers to learning posed by the diversity in the makeup of students (Coffman & Drapper, 2022). The adoption of the UDL framework is especially important in classrooms where inclusion and equity is a challenge (Hatano, 2021). The use of the Universal Design Learning framework heightens accessibility of a course to all students (Burgstahler, 2021; Kumar & Wideman, 2014). The UDL is underpinned by the philosophy that there are multiple pathways in representing knowledge, action and expression of students' comprehension (Pace, 2015; Dalton, 2017; Deku, 2017). The multiplicity and flexibility in delivering instructional content enhances greater access to the learning content (Moore et al., 2018; Hitchcock et al., 2016). This helps in improving the processes of students' learning (King-Sears et al., 2015) and their learning outcomes (Kennedy et al., 2013). Also, providing students with plural means of exhibiting their understanding of the learned content offer additional support to the questioning process of students (Mavrou et al., 2013). Moreover, it heightens the self-determination and self-advocacy of students (Van Laarhoven-Myers et al., 2016). Likewise, diversified approach in engaging the students has been noted to increase the learning processes for students (Tzivinikou 2014).

Although UDL was first targeted at K-12 students, it has gradually found its way into higher education to cater for the ever-increasing diversity (Coffman & Drapper, 2022). The diversity and rising numbers in the population of students in higher education institutions in Ghana poses a great challenge in ensuring equity in teaching and learning activities. Such is the situation of the undergraduate students taking the History of Global Art course in the context of Art-related programs in the Kwame Nkrumah University of Science and Technology, Ghana. Their diversity requires an effective inclusive teaching methodology. This is important because the one-size-fits-all curriculum has been empirically proven to reduce students' learning processes and negatively impacts on the learning outcomes of students in large classes (Galliou, 2021; Smale-Jacobse et al., 2019). Pace (2015, p. 2) reveals that the

"Universal Design for Learning is a new way of thinking that is gaining traction in the world of education as a way of solving the challenges posed by a hugely diverse student body."

The UDL framework's potential as an inclusive teaching methodology in the Ghanaian higher education context has not been undertaken empirically. Deku (2017), in his conceptual paper discussed the Universal Design for Learning as an emerging model in Early Childhood Education (ECE) environments in Ghana. In the conceptual paper, he explained the UDL concept and showed a roadmap on how it could be utilized by early childhood educators and instructors. He discussed how the three key principles of UDL could be actualized in a typical ECE environment. This includes communicating with students in diverse ways such as the tactful use of songs, dances and picture activities (Deku, 2017, p. 72). He recommended the conduct of empirical studies aimed at applying and evaluating the principles of UDL on the learning processes and outcomes of students in various academic levels in Ghana. Based on this premise, the purpose of this study was to implement UDL as an inclusive teaching methodology in the History of Global Art course. The specific aims of the research were:

1. To find out how well the History of Global Art course delivery was aligned to the three key UDL principles

2. To examine the impact of the UDL designed course on the students' learning processes and learning outcomes

Course Design, Learning Environment and Rationale

The History of Global Art course was taught in a 12-week period from June 2022 to September 2022. The course and all of its classes were UDL designed to be highly inclusive. The authors of this study define inclusivity as the ability of designing courses and classroom environments to be able to accommodate the differences of all students. Thus, we hold the position that inclusivity is achieved when a course design is able to address to a satisfactory degree, all the potential obstacles presented by the diversity in the makeup of students. This includes, but is not limited to, the learning styles, academic background, emotional and physical conditions, ethnicity, age, sex, as well as religious and cultural beliefs. The three key UDL principles of multiple means of representation, expression, and engagement, were meticulously followed in the design of the course and in its delivery throughout the 12 weeks. The course design largely reflected the course design and rationale based on the UDL principles used by Kumar and Wideman (2014). In the first meeting when the course was introduced to the students, the first author who was the course instructor explicitly explained the concept of UDL, its key principles and the strategy he has adopted for its implementation for the course to the students. Also, the course instructor (first author) ensured the classroom climate strictly followed the protocols of inclusive pedagogy which is fostering a learning environment where there is mutual respect for every student, every student feels important and sees himself or herself as valued with the potential of contributing to the success of the class. All forms of derogatory labels and negative flagging were highly discouraged and strict measures were put in place to punish culprits who engage in any of these forms of abuse. At the end of the course, the views of the students were sought on the UDL designed course and materials that were developed for the History of Global Art. The other authors, together with six trained research assistants who had no relationship with the students, administered the data instruments for the study. Pseudonyms were used in the treatment of the data before the first author took part in the final analysis and discussion.

<h1 style="text-align:center">Course Design and Materials</h1>

Multiple Means of Representation

Lecture notes and course materials were given in multiple formats. For instance, printed text (.doc and pdf), PPT slides, audio recordings, and video recordings of all the lecture notes and course materials were made available to students on various platforms such as WhatsApp, Telegram, and E-mail. All the videos had graphics and English transcripts. In addition, assignment guides and their accompanying rubrics were provided beforehand in multiple formats such as printed text, audio recordings, and PPT slides video presentations. Soft and hard copy images of artworks in the various art historical timelines were provided. Moreover, use and prompts were tactfully used in all the multiple formats of the course content to draw attention to critical issues worth noting. Different pedagogical approaches such as lecture, discussion, online discussion platforms, project work, group work, case study, and real-time artists' interviews were used.

Multiple Means of Engagement

Flexible collaborative and group interactive in-class and post-class tasks were given. All the tasks assigned were age and ability appropriate. Free choices of the tasks were given based on the weekly topics to be discussed. In all these group tasks, the instructor was readily available to offer constant guidance, assurance and motivation for each member in the assigned groups to be able to contribute effectively to the group project. Multiple means of presenting the projects fostered engagement. Each student in the respective groups were given the flexibility of presenting assigned individual task in the format of choice such as using pictures, text, realias and presenting orally (in-person, virtual, pre-recorded video), PPT presentation, storytelling or narration format, round table discussion, etc.

During class lecture and discussions, students were given multiple means of contributing to the teaching and learning activities in the class such as raising of hands and commenting in class, sending comments via active synchronous and asynchronous virtual discussion platforms such as jamboard, WhatsApp, Telegram, using physical notes, assigning someone to read comments, etc. These varied formats were aimed at accommodating the diversity in the makeup of the students and to motivate them to be active in the class.

Multiple Means of Action and Expression

Varied formats of assessing students' understanding of the learned content were ensured such as reflective essays in text, audio, video or PPT formats. Others were allowed to produce and present on their assigned global art historical timelines using artworks or images. Formative assessment strategies were employed and tasks that catered for the cognition, affective and psychomotor brain networks were given. The assignments that were given to the students were culturally diversified, socially responsive and relevant. Aside the in-class varied means of ascertaining students action and expression, active and interactive discussion platforms on WhatsApp, Telegram, and Jamboard were also utilized. Clear but comprehensive scoring rubrics and assessment checklists on assignments were given. Outlets for further clarifications on assignments were given, such as times to personally meet the instructor for one-on-one discussions on assignments, WhatsApp and Telegram platforms for such purpose,

as well as the assistance of the teaching assistant and students' peer coaches. Visible reminders and announcements on goals and schedules were given on students' online platforms on daily basis. Flexible submission timelines were given to students. Students with exceptional needs were given favorable timelines and extensions were available. Likewise, varied degrees of acceptable performances were given to accommodate the diversities in students' performances. Prompt, timely, differentiated and specific instructor feedback were given to students on their assigned tasks. In terms of examination, varied types of exam questions were used for the end of term examination such as multiple choices, fill in the blank spaces, short answers, and using illustrations in answering some questions. It must be noted that the design and implementation of the History of Global Art course according to the principles of UDL required much time and monetary resources. For instance, much time was expended in responding to the queries of students on social media platforms mounted for the class. In the in-person lesson delivery, much time and patience were required in attending to individual learning needs and queries of the students. Internet bundles, preparation of course materials in multiple formats and the use of flip-charts and other learning materials which were absent in regular lesson delivery were required for the deployment of the UDL-designed course.

Methods

Research Design and Data Analysis Plan

The convergent parallel mixed methods design (Figure 1) was used in carrying out the study. This was deemed necessary to get a more holistic understanding (Creswell & Plano Clark, 2018) on the effects of the implementation of the UDL framework for the second-year course on the learning processes and learning outcomes of the students. Qualitative and quantitative data sets aided in obtaining mutual confirmation to validate the results generated from the study (Arozin & Cameron, 2010). The quantitative data was gathered using the ITSI-S instrument which was analyzed in descriptive statistics using the SPSS for Windows Version 26.0. On the other hand, the qualitative data was garnered using personal interviews and analyzed using the qualitative data analysis spiral (Scott & Usher, 2011) via NVivo 12 software.

Study Participants

Participants for the study were second year university students (N = 122) which is 77% out of the total population of 157 students who enrolled in the History of Global Art course for academic purposes at the Department of Indigenous Art and Technology, Faculty of Art in the Kwame Nkrumah University of Science and Technology, Ghana. The convenience sampling procedure was used for selecting the 122 students because of their easy accessibility, availability at the time of the study and their willingness to participate in the study (Etikan et al., 2016). After the administration of the questionnaire to the 122 students, the researchers explained that there was the need to get deeper insights into how the UDL implementation for the course impacted the learning processes and learning outcomes of the students. As such, views from 40 out of the 122 students who voluntarily agreed to partake in the in-depth follow-up interviews were garnered. This number was deemed enough as data saturation point was reached. The researchers obtained signed ethical consent from the participants. Enrollment to be a part of the study was completely voluntary and ethical protocols were duly followed in every phase of the research.

Data Collection Instruments

The quantitative data were collected using an adapted version of the Inclusive Teaching Strategies Inventory-Students (ITSI-S) by Gawronski et al. (2016). It is a self-reporting survey used for measuring students' experiences of UDL and its impact on inclusivity. The ITSI-S is an already validated instrument with six subscales or constructs based on the UDL guidelines and inclusivity used in ascertaining students' beliefs about UDL and inclusive pedagogy. The overall Cronbach 's α for the attitude subscales of the ITSI-S (6 subscales, 33 items) was 0.75 while the overall internal consistency was reported to be good (Cronbach's α = 0.83). The six constructs or subscales of the ITSI-S included accommodations, accessible course material, course modifications, inclusive lecture strategies, multiple means of presentation, and inclusive assessment. The six subscales and 33 items were adapted to three subscales based on the three key UDL principles with 29 items. The majority of the items which were originally tailored to individuals with or without disability were universally applied to all students. This adaption of the instrument was based on Burgstahler's (2021) position that to achieve full inclusivity means not just accommodating the needs of exceptional students such as those with disabilities but also other diversity parameters like age, sex, ethnicity, and academic background. Thus, broadening the items to students in general would truly define inclusivity. Aside this, 29 items that were closely associated with the three key principles of UDL were selected and included in the questionnaire that was administered.

On the other hand, one third of the sample (N = 40) were further engaged via in-depth interview to garner rich qualitative data on the UDL compliant course using an adapted version of the ITSI-S Experience in Classroom (EIC) 14 questions (Celestini et al., 2021). For clarity, the questions were further broken down into 25 questions related to how well the three UDL principles were meticulously followed in achieving inclusivity in the pedagogy of the History of Global Art course. The instruments were pretested on 15 students who were not part of the original sample. Few corrections were then made after the pretesting before they were finally administered on the sampled study participants. Though the two data sets were analyzed independently, the qualitative data was triangulated with the quantitative data to examine the detailed subjected voices of the students on the phenomenon studied.

Results

The adapted version of the Inclusive Teaching Strategies Inventory-Students (ITSI-S) Likert-scale's responses was summarized using mean and standard deviation, two fundamental statistical metrics. The scale's mathematical mean is 4.0 for the numbers 1-2-3-4-5-6-7. That is (1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = "I have not thought about this"; 5 = somewhat agree; 6 = agree; 7 = strongly agree. Results above 4.0 are considered to be favorable or strong, in theory.

Internal Reliability

Cronbach's alpha was assessed to determine whether the constructs from the adapted ITSI-S created credible overall scale scores. The average relationships among the overall attitude scores show strong internal reliability, according to the adapted ITSI-S's overall for attitude subscales (29 items), which was 0.92. Cronbach's alpha was evaluated to determine whether

the constructs from the adapted ITSI-S created trustworthy overall scale scores. For the adapted ITSI-S, the overall α for attitude subscales (29 items) was 0.92. This implies that the overall attitude scores had good internal reliability.

Demographic Analysis

The demographic data (age and gender) of the 122 study participants were analyzed using descriptive statistics with the aid of Statistical Package for the Social Sciences (SPSS) for Windows Version 26.0. The results are summarized in the table below (Table 1). The study is dominated by male students with a majority (63.9%). As shown in Table 1 below, the majority age range of the participants is between 21-25 years representing 48.4% of the participants. The average age of the participants is 23 years, with a standard deviation of 0.667 (n = 122).

Table 1: Demographic data of participants

Demographic Percentage Variables	Frequency	Percentage	Demographic Variables	Frequency	Percentage
Sex			Age range		
Male	78	63.9	15-20	54	44.3
Female	44	36.1	21-25	59	48.4
			26-30	7	5.7
			31-35	2	1.6
Total	122	100		122	100

The researchers investigated students' perceptions on the UDL-designed History of Global Art course. The items on the ITSI-S were scaled differently to resemble No/Maybe/Yes categories. For the attitude response scale, responses were coded 1 (strongly disagree), 2 (disagree) and 3 (somewhat disagree) as 1 (no) response. Responses 4 (I have not thought about this) as 2 (maybe) and 5 (somewhat agree), and responses 6 (agree) and 7 (strongly agree) were coded as 3 (yes).

Table 2: Students' perceptions on the UDL designed History of Global Art course

UDL	N	No	Maybe	Yes	M	Std.	X^2	P-value
Multiple means of Representation	122	10.33%	5.67%	84%	2.721	0.362	28.67*	0.053
Multiple means of Engagement	122	14.30%	11.50%	74.20%	2.60	0.409	35.22**	0.013

Multiple means of Action and Expression	122	13.43%	6.23%	80.34%	2.670	0.400	25.34	.116

*Note: *P<0.05 or **P<0.01*

As such Table 2 outlines students' perceptions on the instructor's implementation of UDL's three key principles in the teaching of the History of Global Art course. The analysis revealed that the majority of the students that took part in the study shared affirmative responses that the course followed the three UDL principles. For instance, 84% (yes) of the respondents agreed to multiple means of representation as a positive UDL principle with an average of 2.72. Also, the UDL principle with the second majority is multiple means of action and expression representing 80.34% (yes) and the third with a positive response is multiple means of engagement representing 74.20%.

In all of the tests of significance, if p < 0.05, the researchers could conclude that there is a statistically significant relationship between the two variables. The p-value in our chi-square output was p = 0.053 and 0.013. This means that the relationship between the History of Global Art course and students' perceptions on its delivery in the three UDL principles was significant. This suggests that a greater section of the study participants opined that the three key principles were utilized by the instructor and they highly ensured inclusivity in the teaching and learning processes.

Similarly, the qualitative data garnered affirmed the quantitative data set that the UDL designed History of Global Art course was implemented in the three UDL principles. These are some of the views expressed by the students during the qualitative interviews:

> *"I am interested and feel more motivated to learn the course since I'm getting the opportunity to learn the way I feel comfortable to learn. This pushes me to learn boosting my academic performance (ST-01, Personal Communication, 11/09/2022)."*

> *"I feel motivated to learn because the UDL class is more lively compared to the traditional class presentations where everybody would have to stand in the class and give their submission. The UDL class is done differently allowing students to speak freely and speaking a different language other than English (ST-32, Personal Communication, 06/09/2022)."*

Table 3: Impact of UDL Key Principles on Students' Learning Processes and Learning Outcomes

	Beta	*R^2*	*F*	*p-value*
Multiple means of Representation	-.464	.121	16.589	.000**
Multiple means of Engagement	-.374	.100	13.382	.000**
Multiple means of Action and Expression	-.348	.083	10.903	.001**

. The impact is set at .01 and .05* significant levels.*

Ensuring Multiple Means of Representation in the History of Global Art Course

The results of the statistical tests on the impacts of UDL principles on students' learning processes and learning outcomes are represented in Table 3. The dependent variable UDL principle is regressed on predicting students' learning processes and learning outcomes in the classroom. UDL significantly predicted students' learning processes and learning outcomes in the classroom. There is a positive significant impact of multiple means of representation as one of the principles of UDL $F (1, 121) = 16.59, p<0.000$, which indicates that multiple means of representation positively influence (b=-.464, p<.000) students' learning processes and learning outcomes in the classroom. Likewise, the qualitative interviews correlated with the quantitative data results that the multiple means of representation of the History of Global Art course positively impacted on the learning processes and learning outcomes of students. Some of the qualitative views were:

> *"The different types of formats help us to learn in our own learning styles, according to the way they learn. I am not always good at reading and so I prefer videos and audios to text which is very significant to me. This creates equal opportunity for all students to learn (ST-19, Personal Communication, 15/09/2022)."*

> *"It is very beneficial because he engages the whole class and everyone has a different background which actually helps. And that influences how you learn. For example, from where I come from we just observe things and others like to listen or view or talk it out and that aspect of hearing, viewing or talking is very high. He [the instructor] keys into those things for example the picture or a video that he projects for us to analyses, someone who is good with observing or listening to details would be able to say something which influences everyone. Most often when we go to the class of other lecturers, they just project the slides and teach but on the other hand using this format of lecturing benefits every students' style of learning (ST-03, Personal Communication, 13/09/2022)."*

Ensuring Multiple Means of Engagement in the History of Global Art Course

The quantitative results suggest that there is a significant impact of multiple means of engagement $F (1, 121) = 13.382, p < 0.000$ and this indicates that multiple means of engagement (b=-.374, p<.000) play a significant role in positively influencing students' learning processes and learning outcomes.

Similarly, the qualitative interviews confirmed the quantitative results that students' increased engagement in the course improved the learning processes and learning outcomes of the students. Some of the key comments expressed by the students during the interview sessions were:

> *"The instructor creates a class environment where all of us feel respected even though our learning styles are different. He does not tolerate any teasing or whatsoever when a student makes mistakes during presentations. This gives me relief and makes me feel bold to showcase my inborn abilities. Helpfully, this has*

helped me to improve my grades in the course (ST-34, Personal Communication, 11/09/2022).”

“Usually when lecturers come to class we do not normally pay attention in class but with the UDL we are engaged in the course. The UDL approach to the history of Global art course helps me to always get engaged via research. The research I do has increased my knowledge depth in the History of Global Art course (ST-07, Personal Communication, 13/09/2022).”

“The group assignments help us to work in teams which prepare me towards the industry in which I will meet different people with different temperament. Also, it helps in terms of managing our time and being dynamic (ST-18, Personal Communication, 13/09/2022).”

“The lecturer and his UDL approach accepts the diversity of all students. He accepts every input made by a student in class, and it makes me feel happy. It makes me feel like my views have also been listened to. Sometimes when you answer questions in class and you don’t know how to put them but because of the UDL you can express yourself. I have different ways of expressing my views and this motivates me to learn (ST-38, Personal Communication, 08/09/2022).”

“The lecturer is very available to students and approachable. He engages with the students not only in class but also on social media platforms like WhatsApp and Telegram. The lecturer respects diversity and he respects us in our own way (ST-21, Personal Communication, 04/09/2022).”

Ensuring Multiple Means of Action and Expression in the History of Global Art Course

The quantitative results show that multiple means of action and expressions *F (1, 121) =10.903, p < 0.001* impacted positively (b=-.348, p<.001) on the learning processes and learning outcomes of the students who read the UDL designed History of Global Art course. The qualitative views expressed by the students affirmed the quantitative results. For instance, regarding the multiple means for them in expressing their views and assignments, the students said:

“He makes us present our views and assignments in different ways. If we want to print or send it through our media platforms he allows us to do that. It does not bring restrictions, because there are instances that people can’t speak in public so they might do it in their room privately as in a video form and present it, it helps the person present their view very well. I really liked the idea of UDL because it helps others to express their views freely (ST-28, Personal Communication, 08/09/2022).”

“Students are allowed to write their views on paper for their colleagues to read them out if they felt uncomfortable standing in front of the class to present it because of shyness, etc. Also, others share their views on class discussion platforms such as WhatsApp, Jamboard and Telegram platforms for those comments to be projected and discussed in class (ST-18, Personal Communication, 10/09/2022).”

> *"UDL has made it easy for students who are battling with stage fright. They were given options in doing a voice over presentation, video presentations and also posting it on the class social media pages so they have been given the opportunity to do that to adapt to their way of learning (ST-14, Personal Communication, 08/09/2022)."*

In terms of feedback on their submissions, the students affirmed that the instructor gave them prompt, constructive, detailed and motivating feedback. Some of the qualitative views expressed during the interview session were:

> *"We do receive feedback on our assignments that we typed on the page and it helps us to know whatever we have shared is correct or not correct (ST-09, Personal Communication, 10/09/2022)."*

> *"We do receive prompt feedback on the page. When you express and it is not right or true he does not bring you down he tries to tell you that you should have done it this way or that way, he shows you the right path in doing it and that is very good. That is how I feel, like I'm actually learning and he won't bring me down when I'm wrong but show me the correct way to address it (ST-09, Personal Communication, 10/09/2022)."*

> *"The instructor was always available to respond promptly to our views on the things we were studying or discussing. He was quick to respond and give his constructive comments on the views that each of us shared. He always sounded motivational but coached each of us irrespective of the differences in our views (ST-21, Personal Communication, 15/09/2022)."*

The provision of comprehensive course rubrics for all assignments were seen by the students as supporting and motivating them in their learning. One of the key views in the interviews was:

> *"The expectations of every assignment as well as ways of undertaking them to succeed or get a higher grade were clearly spelt out in the rubrics that accompanied them. They were really helpful to us. Likewise, the daily online reminders of assignments and their deadlines were really helpful. It always put us on the alert, motivated us that gaining higher grade was possible, making us take control of our learning (ST-40, Personal Communication, 14/09/2022)."*

Discussion

The study's findings revealed that the UDL designed History of Global Art course ensured greater inclusivity and access. The flexibility and multiplicity of the UDL for the course was able to meet the learning preferences of the diverse students. This heightened engagement of students during the teaching and learning processes. Similar views were expressed by Smith (2012) as well as Fornauf and Erickson (2019) who found out that a UDL course design ensures high engagement levels of students because it attends to the variability in the learning styles of students. The UDL design for the course did not impose restriction on students' thinking, heightening creativity amongst them. This confirms the views of Hartmann (2011) that UDL course design removes all potential restrictions that can become standing blocks to

the learning of students. Such flexibility that enhances the engagement of students makes the students gain control of their learning (Kumar & Wideman, 2014). Moreover, to ensure an inclusive climate in the History of Global Art class, the students mentioned that together with their instructor, they set clear classroom ground rules steeped in inclusivity. Setting ground rules on inclusivity practices in the classroom provided an inclusive climate which greatly reduced the unnecessary stress faced by students as Miller and Lang (2016) observed in their study.

The students admitted that the representation of the History of Global Art course materials in multiple formats impacted positively on their learning processes and learning outcomes. The key views bothered on how the varied presentation formats of the course content appealed to the differing learning styles of the students, encouraging them to learn, and reducing or eradicating completely the anxiety of students. Coffman and Draper (2022) mentioned that the multiple means of course delivery stimulated the varied senses such as textual, visual, aural and kinesthetic senses of learners and this impacted positively on students' learning processes and learning outcomes. Similarly, Black, Weinberg and Brodwin (2015) as well as Smith (2012) realized similar findings in their studies where the multiple means of representation heightened the interest and engagement of learners for the course.

The study's findings suggest that the inclusive approach used by the instructor in offering multiple means of engagement improved the learning processes and learning outcomes of the students who read the introduction to history of Global Art course. The conducive and inclusive learning environment that was created motivated the students in getting much engaged with the course and this positively improved their learning outcomes. Also, the cooperative projects and group assignments where mixed abilities were grouped assisted all the students to get highly engaged with the course. The application of the UDL course design promoted an inclusive climate where students felt a part of the teaching and learning processes. This is seen by Tobin and Behling (2018) as very helpful for higher education institutions allowing them to follow the ethics of accessibility, openness and equity in education. Moreover, the study's findings have shown that when students are engaged both in-class and outside the class using interactive multimedia such as social media platforms accessible to them like WhatsApp, Telegram, and Jamboard used by the course instructor, it highly draws students into the course, impacting positively on their learning. This corroborates with the findings of Dean et al. (2017) that when students' engagement for courses extend beyond the classroom, especially for introductory university courses with large classes, it positively impacts on students' learning. Students were able to hone their in-born abilities through an exposure to their own learning styles and this bolstered their engagement levels. The students mentioned that the group assignments as part of UDL's multiple means of engagement, promoted the development of their collaborative skills, team-working skills, problem-solving skills, critical thinking skills, increased learner engagement as well as good time management skills. This study finding has been observed in various studies (Kumar, 2011; Pham, 2013; Gagnon & Roberge, 2012; Abegglen et al., 2021).

Moreover, the study's findings affirmed that the multiple means of expressing views and submitting assignments embraced the differing learning styles of the students. Also, it accommodated for the limitations in the students' learning abilities. This bolstered their confidence and determination, allaying their fears and worries of their inadequacies, and enabling them to contribute meaningfully to the teaching and learning processes. La, Dyjur and Bair (2018) observed similar findings after offering students multiple means of

expression and submitting assignments such as student projects and class presentations using varied formats, reflective papers, in-class assignments, and feedback from different sources (virtual or electronic platforms). They realised that the multiple means of expression gave students the opportunity of showing evidence of their learning other than the usual sit-down exams. This reduced their anxiety of assessment and served as a source of motivation as Rose et al. (2006) also observed in their study. Students' appreciation for the varied choices in the mode of submission of assignments for the course was similarly noted in the study of Karayianis (2022). This geared the students up to engage in active learning of the course (Nave, 2019; Coffman & Drapper, 2022) though they initially expressed dismay in learning history-related courses at the introductory phase of the history of Global art course. Likewise, unlike the summative assessment the formative assessment utilized aided in tracking students' progress of learning, resulting in higher attainment of grades (Kumar & Wideman, 2014) while exposing serious learners as well as disconnected learners.

The students mentioned that they were given multiple ways of presenting their views on questions asked during class engagement, whether in-person in the class or virtually on the class discussion platforms. Also, they indicated that the prompt, constructive and motivating feedback they received were really helpful. The students interviewed intimated that the interactive nature of the course as well as the prompt feedback they received helped them to develop intense interest in the course. This fostered a good, respectful, supportive and interactive relationship between them, their peers and the course instructor. Similarly, Deku (2017) as well as Coffman and Drapper (2022) observed that such regular and effective interactions are supportive to students' learning and positively improve their perceptions of learning.

Aside from the multiple means of presenting students' actions and expressions, the students mentioned that the instructor offered them comprehensive rubrics for all the assignments that he gave them. They admitted that those rubrics offered enough guidance on how to present their assignments in ways approved by the instructor. In addition, daily online announcements on deadlines for assignments constantly put them on the alert and the availability of the instructor either in-person or virtual was helpful as it assisted them in seeking for more clarifications on the assignments when necessary. Students found the detailed assessment rubrics very supportive to their learning (Coffman & Drapper, 2022) because it gave them comprehensive information on the expectations of the instructor for each assignment and how they would increase their performance in scores. The students realised that the clear but comprehensive course rubric made available to them and the regular guidance on assignments provided by the instructor was found to be motivating, helping them gain full control of their learning. Abegglen et al. (2021) similarly noted that when course rubrics are well-designed and offered comprehensive guidance to students, it ensured students' self-motivation.

Conclusion

This study was aimed at finding out whether the UDL framework as an inclusive pedagogical approach when implemented in the higher education context in Ghana holds the potential of improving the learning processes of second year students reading the History of Global Art course in the Kwame Nkrumah University of Science and Technology. The key findings in both the qualitative and quantitative data sets have strongly affirmed that UDL when used in the designing of a course with its three key principles holds great prospects in improving the

learning processes and learning outcomes of students who may not have had any interest in the course of study.

The key findings of the study suggest that a UDL-designed course ensures greater inclusivity and access. This is as a result of the flexibility often associated with the multiplicity in the representation of course materials, multiplicity in engagement and multiple means of action and expression assisting in meeting the learning preferences of the diverse students in a large class setting. Visual, aural, textual, and kinesthetic learners for instance are able to access course materials, learn and express their views in their preferred formats. This inclusivity and access guaranteed by the UDL-designed course increased the engagement levels of students in the learning process resulting in high motivation while impacting significantly in their end of course assessments. The flexibility of a UDL-designed course fuels students' creativity, allowing them to develop projects that demonstrate their unique academic potentials as well as essential skills such as problem-solving, critical thinking, and good time management skills. Moreover, a UDL-designed course ensures an inclusive classroom climate that makes students active learners who feel a part of the success in the teaching and learning processes in the classroom. Collaborative activities such as group projects and class presentations that were both in-class (face-to-face) and outside the class (on virtual platforms) highly engaged the students to be motivational learners during the delivery of the UDL-designed course. The unnecessary stress and fear associated with assessment were allayed as students were given options in the formats for presentation of assignments as well as comprehensive rubrics that offered guidance on how to present assignments to meet the demands of the instructor. The interactive nature of the UDL-designed course fostered a healthy relationship between the instructor and the students enhancing the motivation of students to learn as they received prompt and constructive feedback anytime they needed some support in their studies.

It can be concluded that UDL-designed courses that follow the three key principles of multiple means of representation, multiple means of engagement and multiple means of action and expression help students to be active and motivational learners who voluntarily want to be a part of the teaching and learning processes. The flexibility in the choices given students in the course delivery, gives them a voice in the delivery of the course ensuring the self-regulation of their learning, an important intrinsic motivation for them to learn. The extrinsic motivation of instructor via their inclusive practices, availability to offer support as understanding coaches, and the offering of a plethora of diverse course materials and delivery modes positively influence students learning processes and learning outcomes.

Based on these conclusions, it is recommended that the Ministry of Education in Ghana, through its agencies such as the National Teaching Council with the support from the Ghana Tertiary Education Commission (GTEC) and Transforming Teaching, Education and Learning (T-TEL) should organize workshops for all teachers on the use of UDL for teaching to ensure that inclusivity and access in the delivery of the teaching and learning activities in the various academic levels are guaranteed. This would ensure that students, irrespective of their diversity as a result of their learning styles, emotional, and intellectual differences that could have been barriers to achieving access to education are surmounted. While the Ministry of Education is tasked to spearhead this initiative, it is important that they provide the required resources to assist teachers to ensure that course materials are offered in multiple formats to meet the learning preferences of the diversity of students in the Ghanaian classrooms. Teachers must exhibit high dedication toward the teaching profession. They must be creative to improvise with local materials available in their vicinity in offering multiple

options for students in the teaching and learning processes to make them active and motivational learners.

Limitations and Future Research

This research is a pioneer study on the implementation of UDL to courses in the higher education context. The UDL principles were used in re-designing the History of Global Art course with the objective of finding out if the UDL-designed course could positively impact on the learning processes and learning outcomes of students. The conclusions were based solely on the feedback expressed by students after the delivery of the UDL-designed course and their own comparisons with non-UDL inspired courses as was evident in some of the qualitative views they expressed. Likewise, the UDL principles were applied to only one course and not two courses where the results in both courses could be compared to better appreciate the impacts of UDL. Moreover, the views for the conclusions were solely based on feedback from students and not the instructor. Furthermore, the instructor put several design elements together with the sole objective of ensuring inclusivity. As such, it is hard to say whether all of the design elements were required to achieve the reported impacts in the study.

It is recommended that future studies that aim at measuring the impact of UDL-designed courses in the Ghanaian higher education institution context make use of both experimental and control groups. This would aid in better measuring how UDL impacts on the learning processes and learning outcomes of students. Also, instead of gauging the impact of UDL from a single course, future studies could assess the impact from two or multiple courses in different disciplines to better appreciate the variance in the impacts of each of the UDL principles across courses. Moreover, after the implementation of a UDL-designed course, it would be great to understand the perspectives of the instructors and not just the students. This would inform instructors of the potential challenges and how to surmount them in their quest of implementing a UDL-designed course. It is also recommended that future studies should also look at UDL's implementation in the pre-tertiary levels of education in Ghana.

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