Research for Strategies of Visual Literacy Cultivation in the Age of Big Data

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Abstract

Based on visual culture context and probability forecasting, it is critical to seize the opportunity of the Age of Big Data to cultivate and improve students' visual literacy for a better future of learning and education by certain strategies, which including thematic inquiry dialogues between teachers and students in cyber space, role play of teachers to listen, connect and ruminate, students being major speaker in the space, construction of learning community and etc..

Key words: The age of Big Data; Media; Visual literacy

1. THE AGE OF BIG DATA AND VISUAL CULTURE CONTEXT

1.1 Opportunity in the Age of Big Data and Visual Literacy Requirements

The fact that the world becomes images embodies the nature of modern times as Martin Heidegger pointed out. Daniel Bell also said that the voice and image, especially the latter, organizes aesthetics and commands audiences, which are almost irresistible in a mass society (Zhou, 2008, p.1). Moreover, Nicholas Mirzoeff expressed his ideas incisively by saying that so-called visual culture is not only a part of life, instead, it is indeed our daily life. We are living in an age that is affected by media and even dominated by the network. Regarding learning and education, it is published by *The Horizon Report of New Media Union: Primary Education Version in 2013* that new techniques will have a significant influence on primary education informatization during the coming five years.

In the age of visual culture, the art that students confront are no longer as what it was before with numerous varieties, different styles and uneven quality. How to distinguish and judge between good and bad has become a problem. With advanced visual duplication techniques, high-pixel cameras, visual exhibition techniques and other media of varieties make it clearer and easier to perceive for the images students confront. Taking advantages of above mentioned media techniques, teachers pay more attention to students' visual perception, however, in such circumstances, would students know how to appreciate and criticize the visual information they received? How would teachers guide students to look upon the reading of fast-food style with massive visual information from network? How would teachers take advantages of Big Data flexibly for effective teaching with the support of intellectual media? Have they possessed visual literacy to face challenges? There is no deny that the generation gap between visual reading ability and visual culture age and the incapacity of fine arts teaching etc. give rise to a great many of Visual Illiterates (from Alvin Toffler) in primary and secondary schools who are incapable of learning, expressing, solving, creating and visual images communicating. "We will be visually illiterate forever if we do not learn to read those visual images around us which are becoming more and more complex." (Howells, 2011, p.1)

Since the middle of 1960s, visual literacy draws wide attention and people have different opinions upon its identification. As the relations between image and reality

turned from surface to self-reference, image reading turned from reading in silence to read in astonishment. Thus, as a reading subject in modern visual paradigm, reading individual should attach importance to understand and interpret reading objects. In author's opinions, visual literacy, on one hand, is sort of culture literacy via media of vision substantially and, on the other hand, is the ability to perceive, solve, judge, communicate and apply images. Teacher Wang Dagen pointed that people in modern times with visual culture context should be capable of visual writing and reading in processing image dialogue and such capability cultivation should be undertaken by fine arts education. How would fine arts education take advantages of media and big data to cultivate and improve students' visual reading ability? What kind of visual literacy should students possess? Since entering twenty-first century, it is advocated by different countries around the world during education reform that teachers should carry out individual teaching method considering individual diversity of students, try to adjust teaching strategies according to the big data of students' learning behaviors as medical education did, and adopt evidence-based teaching (EBT) (Mayer-Schönberger & Cukier, 2015, p.14) which is the ideal status we are pursuing for future education. From the learning analysis system of Khan Academy, the ameliorated teaching method of speaker teacher of Coursera in terms of big data, and the individualized recommendation service strategy with high accuracy of Amazon in terms of big data, we obtained valuable practical reference for the individualization and effectiveness of fine arts teaching according to which teachers teach students in accordance with their aptitude.

1.2 Intercourse Between Teachers and Students in Cyber Space

As experts pointed, there will be six techniques entering primary education field in the following five years. Such entering and application consist of three stages, that are short term, mid-term and long term. In the stage of short term, namely in the coming twelve months, Cloud Computing (or cloud environment of Class Link) and mobile learning will become application of the main stream. For example, Twitter, as the pioneer of micro-blog, set a special program for education application. Similarly, EDUCAUSE also set a program for micro-blog techniques. Online learning and communication have become the unavoidable strategies for primary education of fine arts. It is also an unavoidable selection for current teaching and learning activity to interact and carry out teaching and learning in cyber space.

1.2.1 Popularity and Instantaneity of Interaction Communication

Different from unitary communication and one-way feedback in the age of small data, the age of big data accomplishes equal education opportunity at the maximum and forms intersubjectivity. The emergence of

disinhibition will give rise to public self-consciousness to a great extent and make it come true for intercourse interaction and popularity.

> In this case, what internet accomplishes is not the cognition relation between individuals (subject) and network (object), but the relation between individuals (subject) and individuals (subject). The subject-object relation formed by relation between subjects is no longer the traditional S-R relation, but a new two-way interactive and complementary relation, which is a new cognition relation with the internet as the media. (Sun, 2001).

This is kind of interactive subjectivity.

With the technical support, teachers could, to a great extent, communicate with students in a synchronic and instantaneous way by using wechat, QQ or other media, meanwhile, teachers could break through the limitations of teaching materials, teaching time and the like which lead to many disadvantages including narrow communication between teachers and students or among students, unitary communication content and simple communication mode, etc..

1.2.2 Individualization and Humanization of Communication

In the past, it is difficult to ensure the reality of teach students in accordance with their aptitude based on education system and teaching method designed according to average standard, which is called "one size only fits few students", said by Salman Khan, the founder of Khan Academy. What we need is one size fits one student. To do that, we should individualize the knowledge transmission based on specific learning environment, learning stage, physical characteristics of students, interest, ability and literacy etc., and then to break through previous homogeneous teaching method, making it possible to optimize learning. In a rational, equal, free cyber intercourse, we could ensure the individualization and humanization of communication at the most. As per the feedback from big data, constituting corresponding communication mode and guidance strategy makes it possible to avoid some unexpected situations or disadvantages including slackness in communication, irrational phenomenon and homogeneous ideas, etc..

2. MEDIA SPACE AND VISUAL LITERACY CULTIVATION STRATEGY

In the media age and visual culture context, how to take advantages of media space to cultivate and improve students' visual literacy becomes an increasingly important topic which high-education teachers and primary and secondary fine arts education should face and explore together.

2.1 Media Usage and Selection of Read

In the visual culture context, students' way of reading, including selection and interpretation of works, is

different from that before. Today, what should we read? How should we read? How to build the modern visual paradigm with support of current media techniques? In the teaching of fine arts, paying attention to what and how students read is to utilize individualized visual and life experience from different students to activate the traditional and boring teacher-oriented classes so as to gradually cultivate and improve the visual literacy of both teachers and students in mutual understanding and communication. In this case, characteristics of fine arts including visualization, humanization and etc. are presented. Moreover, teaching of fine arts achieves humanistic concern and education value in terms of visual culture context.

It is the precondition of cyber teaching and carrying out space intercourse as what to present to students and how to present more meaningful visual information in cyber space, which is similar to our attitude and utilization to teaching materials. Every version of teaching materials is criticized by many first-tier teachers, they think the composition is not rational enough and irrelated to students' living experience and local situation, lack of systematicness and operability, and they have no idea how to utilize the teaching materials, etc.. The composition of teaching materials is based on the curriculum standard and is the content carrier of curriculum standard's embodiment, however, when transformed to teach materials, partial information of teaching materials may be distorted unavoidably. Teaching materials can be predetermined or generated, and how to utilize it depends on teachers' professional level. Teachers should be capable of analyzing teaching materials, utilizing it reasonably, processing and improve it according to curriculum standard, students' actual learning condition, school condition and learning target. It is the same case for teacher to select and offer cyber visual materials.

Network is regarded as an extension of class, but the visual resources in the network are too much for good and bad mixed together, so it is the premise to read selectively with a teacher's guide. Besides the content of teaching materials, related auxiliary visual materials like classic video of famous teachers. Interpretation of expert works and other materials constitute open content of cyber resources which are different from teaching materials. It is one of the tasks for current fine arts education to guide students to return to co-called Living World (by Husserl) by providing relevant and effective visual resources. "There is only one topic for education, that is, colorful life. " (Whitehead, 2002, p.12). We could build the connection with the world outside of the classroom through visual resources in cyber space and joint discussions.

2.2 Thematic Inquiry Dialogue: Build the Bridge of Communication Via Quality Questions

Based on the content of teaching materials, dialogue between teachers and students in cyber space will carry out inquiry study around specific themes. In traditional fine arts teaching, teachers always adopted the method that knowledge is the logic or lecturing is the logic so that the learning is passive basically at that time. Adopting thematic inquiry dialogue is an intercourse process to guide students to recognize, construct or even deconstruct knowledge, which is an effective way to utilize students' current experience to stimulate their sense of question, promote learning, guide teaching interaction and make teaching benefit both teachers and students. As Gagné pointed that capability required by learning is the precondition of learning.

When theme is well set, questions should be used to build the bridge of communication between teachers and students. We could use question as an incentive to stimulate students' thinking, imagination and creation and as a catalytic agent to start recognition, deepen learning and expand knowledge. With guidance of questions, students will obtain visual literacy including individualized, criticized analysis and understanding of fine arts works or phenomenon, etc. so as to improve their own esthetic ability. Building the bridge of communication between teachers and students via quality questioning in terms of theme is to turn procedural curriculum in unit "target—accomplishment—assess" to project curriculum in unit "theme—inquiry—presentation" (Manabu, 2012, p.1), to turn teacher-oriented mode to student-oriented mode that teachers and students build learning community for united inquiry.

How to ask questions? How to ensure the effectiveness of questions? How to make questions of catalytic agents to optimize classes? How to make questions of an important tool to improve various abilities for students? Doctor Jackie Acree Walsh and Beth Dankert Sattes, Amecican education experts, developed QUILT frame together, a professional development mode to accelerate learning and thinking via questions and understanding. The frame consists of five stagee, they are, preparing questions, state questions, stimulate students to answer, process students' answers and rethink to question, all of which are interpreted in the book Quality Questioning. When designing questions, we need to think about comprehensively whether the question is related with teaching target and students' experience, whether the question is suitable, pertinent, feasible and extendable, whether the question is enlightening and humanized, whether there is logic relations between questions, particularly important, whether the question can bring about questions from students, etc.. "It is real learning only when learners can understand and raise questions by himself" (Rosenshine). "Not all the students know how to raise quality questions at the beginning, but all of them can be taught how to raise questions." (Walsh & Sattes, 2009, p.101) The questioning art in class—develop teachers' skills for effective questioning, written by Marylou Dantonio and Paul C. Beisenherz, identifies core questions and processed questions and describes its

setting strategies, which is worth using for reference by teachers and students.

The base of thematic inquiry dialogue theory is constructivism teaching theory, namely, PBL mode (learning in terms of questioning). Teachers adopt Scaffolding Instruction[1] and students explore strategies via teachers' guidance, cooperation and discussion with team members based on questioning, learning from doing and practicing *Five Ways to Thin*k put forward by John Dewey. The mode refers to the cultivation of spiritual habit of the five cognitions (on account of thinking of reality, learning different ideas from partners, thinking significant connections, thinking with hypothesis and thinking with reality involved) advocated by DePaola Maya who is the headmaster of Mission Halu School, a well-known school in the world, in Muinolidi district, center of Boston, Mexico. The goal of thematic inquiry dialogue and learning is to cultivate students' modern learning ability, to develop their dominant learning ability (knowledge, skill and understanding) and recessive learning ability (care, motive, attitude) together[2]. Such education and teaching are co-called of knowledge, of method, of life and of realm pointed by Liu Zhangming, the headmaster of Beijing 4th Middle School.

According to teaching theories Zone of Proximal Development, teachers should utilize stratified and rational questions to guide and further students' learning based on curriculum design and teaching content stratification, and then follow the incremental logic sequence from observation to feel, from surface to centre and gradually cultivate students' comprehensive visual literacy. Just like class teaching, the thematic inquiry dialogue in cyber space also needs to set predetermined target and generated target which is the precondition to ensure the effectiveness of thematic research.

2.3 Listen, Connect and Ruminate: Teachers' Roles in Cyber Space

During outstanding teaching activities, it is teachers' job to listen, to connect and to ruminate. It is the same case for cyber space intercourse. Though student-oriented cooperative learning is advocated by primary and secondary classes, famous Japanese educationalist Manabu Sato pointed out in book teachers' challenges that cooperative learning is based on mutual listening. In order to ensure the good effect of classes, teachers should firstly listen to every student attentively. DePaola Maya, the headmaster of Mission Halu School, insists that teaching lies in listening and learning lies in speaking. At the start of democratic practice, the mode of mutual listening and cooperative learning has been followed by many schools in the world.

The premise to listen with care, concentration and patience is to respect every student, every individualized life. Soviet Union educationalist Makarenko think where there is no love, there is no education, namely, the precondition of love is to respect. As Manabu Sato pointed out, whether cooperative learning can be formed in the teaching to a great extent (near to 70%) depends on whether every child is respected, and teachers' experience, learning theories and teaching skills occupies only 30% (Manabu, 2012, p.5) Carefully listening to every students embodies teachers' respect, love, care and demand to students. It to a great extent relies on teachers' attitude and affection to students whether students have sense of existence, whether students are interested in fine arts and knowledge, whether students' potentials are aroused. Then, how to listen to students? For example, when the teacher asks a question, he needs to listen to what students answered even though the answer is not what he presumed, when the teacher need to listen students finish their answers without interrupting them or guiding their ideas to the desired one in order to finish current teaching content hurriedly. Once interrupted or guided, the students might lose interest, confidence and imagination, which may be remedied by long time and much more effort. Listen to students' speech means to accept and think his speech in below three situations. First, why did he state that and what made him? Second, is his speech related to other classmates and what's the relation if yes? What is the relation of his speech to his previous speech?

Connection is to connect various factors and various aspects together such as teaching materials and teaching materials, students and students, students and teaching materials, class and society, nowadays and future, etc.. It is connection that can make knowledge systematized, thinking logicalized and theories practiced, finally accomplish the goal and value of learning. As Manabu Sato pointed, in order to ensure the depth and width of communication, what teachers should do be not to entice answers but to ruminate. The ignorance or missing of rumination in dialogues between teachers and students will make it stagnant for classes, knowledge, thinking of students and capability development. "Somebody considers that…" and "Any else ideas?" become teachers' commonplace sayings instead of some more expandable

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[1] According to EC relevant documents on distance education and training program (DGXIII), Scaffolding Instruction is identified that scaffolding instruction should provide a conceptual framework for learners' forming understanding to knowledge. The concept of conceptual framework is required to develop learners' further understanding to questions. It aims at cultivating students' problem-solving and self-learning capability. With Lev Vygotsky's theory of zone of proximal development, teachers resolve those complex learning tasks and provide proper, small clues or tips (scaffolding) step by step, guiding their understanding and learning to a deep and complete stage. Finally, students become independent learners, master what they have learned and improve their problem-solving abilities.

[2] Professor Zhong Qiquan of East China Normal University criticized the double basic theory which has been stressed by Chinese educational circle for a long time. Combining with Japanese education theories, he put forward the concept of learning ability. Modern learning ability consist of dominant learning ability (knowledge, skill and understanding) and recessive learning ability (care, motive, attitude), the latter of which is much more stressed.

and deep follow-up guidance such as "why do you think so?" "How do you figure it out?" "And then?" Such questions can guide students to answer "I don't know about this", "I want to listen to other classmates' ideas" and "is there any better advice?" etc.. If students answer questions like that frequently, then students themselves start to ruminate and meanwhile teachers can feedback with rumination timely and wisely. Under such circumstances, functions and values of fine arts teachers can be presented.

2.4 Subject of Speech: Students' Roles in Cyber Space

Currently, predetermined teaching of Reception Learning Style is still popular in China instead of predetermined generated teaching. Most teachers of fine arts haven't connected reception learning with research-based learning effectively, and in general fine arts classes, it is still the teacher who dominates the class and students just listen to what is taught without questioning.

Comparing to traditional classes, cyber media make it easier for students to become the subject of space. For example, Patricia Wallance, an American psychologist, mentioned a story in *Internet Psychology* that an ordinary-looking student becomes confident again from the network, which illustrates the advantages of cyber intercourse over face-to-face intercourse in real classes. The student-oriented cyber mode is to make students the governor of space with timely guidance from teachers in an equal, rational and free intercourse atmosphere. In that space, students need to put three dialogues into practice, that is, dialogue with the objective world, dialogue with partners and dialogue with themselves, which forms the mode of three-in-one learning. Among these three dialogues, the one with themselves are especially important, which is the base to make students the subject of speech in cyber space. Through dialogue with themselves and learning, students can internalize the scientific concept and meaning, pointed by Lev Vygotsky, to spontaneous concept and sense, when the mind of students is developed and visual literacy cultivated or improved.

2.5 Learning Community: Social Forces Involved

In order to promote the establishment of learning and learning community of students, Manabu Sato advocated that teachers should make classes open and set up experts-oriented collegiality with shared growth on campus so as to form practice community (Ibid., p.114). Learning community is to turn individual learning to community learning by holding corporate seminars involved many participants from the campus or outside the campus based on students' personal experience and diverse individuals. Learning community is constructed based on commonality, democracy and individuality-stressed advocated by Dewey. Particularly, collegiality is one of the critical factors to decide if the school reform will

succeed. Collegiality is a relation constructed by teachers on campus to make it public for their own practices and then make comments to each other and join together to explore. So, collegiality is helpful for teachers' professional development and makes them reflective practitioners. Also, learning community is sort of practice to take education as public cause.

In order to ensure the effectiveness of online learning and lasting effect of online learning mode, it is also essential to build learning community for online learning which is constituted by students, teachers, parents representatives and major-related experts etc. on account of separate classes. Regarding the management to cyber space, it is worth adopting as reference for the management of Mission Halu School in Muinolidi district, center of Boston, Mexico. School management committee should consist of five parents, five teachers, five citizens and two students, whose speeches and expectations are equally respected (Ibid., p.105).

In order to avoid the formalization of learning community's tasks and boastful cyber intercourse behaviors, we should establish a set of effectual regulations toward cyber behaviors. Diana Kindergarten in Lega Emilia, a small city of North Italy, was known as the most avant-garde school in the world. One of its achievements on creative education is the community idea. Taking it as a reference, when outside the classroom, in the cyber space or when students are offline, other members of the community should gather to discuss the learning situation of in-classroom learning and online learning, on one hand, to anneal their insight and practical design ability, and on the other hand to discuss the questions arose during students' learning by listening again. Then, they should search for corresponding strategies to establish specific feasible method and connect it with previous learning.

Regarding learning community, there are still many questions need further researching. For examples, how to construct it specifically? How to coordinate the relations among members of the learning community? How to treat the contradiction of various opinions and integrate them into one? How to promote collegiality? How to ensure the time and space for learning? How to solve the self-discipline problems in cyber intercourse management?

3. SEARCHING FOR STRATEGIES ON ACCOUNT OF INTERCOURSE DATA

As the big data prediction is more and more accurate and detailed, it becomes increasingly real to set up intervention measures which tend to more specific and tender so as to ensure the effectiveness of intercourse and teaching.

What we see through big data is always correlation, which seems to be connected and correlated by variables which are not

known to us. These variables will not tell us how things happen but what are happening, which is enough for us to make decisions in most situations. (Mayer-Schönberger & Cukier, 2015, pp.45-46).

Certainly, when utilizing media to predict probability, intervene teaching, establish individualized teaching strategies and humanized space intercourse strategies, we need focus on big data sensitively and meanwhile pay attention to potential threats and risks such as the impact of unforgettable old data on students' future development (including the possibility of old data being the basis of assessment, the way to master personal data privacy, etc.), the stereotying brought by big data utilization, the succession, completion and accuracy of probability prediction, and uncontrollable education distributary, etc..

As Clay Shirky, a professor at New York University in USA, asserted, that determine the future of education is those organizations who utilize big data to adjust learning. Various media in the age of visual culture provide fine arts education with decision-making big data and effectual teaching decisions are made with the help of attention and intelligence of various media. Change thinking mode, organize learning community, construct rational, humanized, artistic cyber intercourse space. They are feasible to improve students' visual literacy and form modern visual paradigm.

REFERENCES

Howells, R. (2011). *Visual culture* (p.1). Guiling: Guangxi Normal University Press.

Manabu, S. (2012). *Teachers' challenge* (p.1). Shanghai: East China Normal University Press.

Manabu, S. (2012). *Teachers' challenges*. Shanghai: East China Normal University Press.

Mayer-Schönberger, V., & Cukier, K. (2015). *Learning with big data-the future of education* (p.14). Shanghai: East China Normal University Press.

Mayer-Schönberger, V., & Cukier, K. (2015). *Learning with big data-the future of education* (pp.45-46). Shanghai: East China Normal University Press.

Sun, Y. X. (2001). Reform of cyber age and people's existing style. *Journal of Seeking Truth,* (1).

Walsh, J. A., & Sattes, B. D. (2009). *Quality questioning—involve every student* (p.101). Beijing: China Light Industry Press.

Whitehead, A. N. (2002). *The aids of education* (p.12). Beijing: Joint Publishing.

Zhou, X. (2008). *Turning of visual culture* (p.1). Beijing: Peking University Press.