

Is this paper worth of reading?

~Research is towards more scientific analysis of grain size cogntiion while there is a movement which try to do more practical research topic ~

The current trend's is that teachers try to apply the scientifucally-proved knowledge into classroom instructions, and researchers know the importance of scientifically proved evidence and its possiblity for implications in America and Japan. so researcher try to tuckle the rigorous topic which is directly relevant to instruction so that it will be applied in classroom as a bridge between lab and real classroom.(Robert S.Siegler,2001,Klahr,2001, the new source for Harvard Graduated School of Education,2002). But it is also true that reserch topic of educational technology come to focus on the basic fragment of cognition which is difficult to apply to instruction as it is.

So each research in field of Multimedia Learning is a grain size. few has not published books or journals which summarize these grain size analysis into integrated and categorized arrangement in order to make easy to apply them into instruction strategies.

In what respect this paper is new

RQ.No.1 focus new aspects of "Learning problem" which multimedia learning can contribute to. RQ.No2 and RQ.No3 is new in a respect that it re-organize theory and result of experiment for easily applying theories into practical use. And RQ.No4 cararify and summarize aspects of multimedia which can contribute to Creativity. Thoughh these works, My aim is to know what we have to do for bringing out the full use of the potential of visual learning and thinking. In this paper, I mainly dealed with "visual learning".

Value for whom

Generally speaking, this paper is for thoes who is interested in making full use of the individual student's talent in the process of "Learning" with full use of visual presentation potential, but not "to be educated".

Research Question No.1 would be useful for thoese who are interested in new aspects of multimedia learning contributes to current problem of "Learning".

Research Question No.2 would be usful for thoes who wants to know about the rule of visual and verbal presentation when they are used for intellectual gain.

Research Question No.3 would be useful for those who wants to know what is framework of content on which multimedia learning become effective.

Research Question No.4 would be useful those who are iterested in the association possiblity of relationship between Creativity and Multimedia Learning.

Introduction

Structure of Introduction

Preface as introduction

1 Explanation about what is this paper's main subject., that is,bout two main research questions.

1. What is origin source bring me to these two research questions and my self-interest
As a clue with which reader can demystify this paper.

- **Background; verbal presentation is main medium.**

~Argument~

Pro-position-----what most of presentation is done in verbal is a problem

Because of the possibility to inhibit Creativity

Evidence which show Creativity is inhibited if most of presentation is verbal medium.

Detail of information design and its reliance

Con-position----- what most of presentation is done in verbal isn't a problem

Because of majority of students are verbal preference styles.

So current education meets majority's needs.

Weighing which win, con or pro?

2. Is this paper worth of reading to others ? what is objective value?

Research Question No.1 as an answer to a question raised in preface Creativity and multimedia learning has strong good effects ?

Creativity	1 Origin of Education, Origin of Creativity
	2 Conflict whether Creativity contributes enough to education or not.
	3 Evidence analysis which win
Multimedia Learning	1. Origin of Multimedia learning, Origin of Learning
	2. Conflict whether Multimedia learning contributes enough to
	3. Evidence analysis which win

1 Preparation for argument

Key conflict and transition of ideas in history

3 Comparison of Evidence

~Notice~

In this paper, pro-position has two meanings. One is used as positive position which support my hypothesis or prediction. The other is simply used as a position which support positive result like

1

It works or it is effective. So the opposite are the con-positions.

Preface

The aim of this paragraph is to explain this paper's aim and double theme.
Aim of this paper is to find new aspect of the potential which visual ways of learning and thinking have. In other words, how much visual material can contribute to Intellectual development of the human-beings.
To bring out full potential of visual ways of learning and thinking, Visual display has to follow the design rule. This paper is to summarize the rule of visual material for giving learners intellectual gain.

There are two consistent root questions in this paper.

First of all, not to confuse reader, I briefly clarify the word "Multimedia Learning". It is Learning with both visual and verbal.(Mayer,2001). Multimedia presentation is done mainly with computers. That is, Multimedia learning is audio-visual learning using computers as a tool(which is not defined by original definition, but taking practical use into consideration, it can be said like this.)Multimedia presentation used for learning is incongruence between formats but it must result in understanding pedagogically relevant as long as its aim is to organize educationally meaningful learning.

And so that learners organize meaningful learning from multimedia presentation, The information design becomes important as well as the program itself.

What I mean "information" here is the information which can be gotten with information machines and tools represented as computers.

1. How should we arrange and design multimedia information to organize active knowledge acquisition?

This is one root research question. It is mainly discussed in RQ.No.2.

One of the most beneficial parts of multimedia learning is what enables students to visually think and learn. Which hardly accomplish in traditional way of education. Another root question is for the aim looking not o

2. "Can computer-software which help us visualize our idea contribute to creativity which today's education ask for ?"

That is relationship between "Creativity" and "Visual learning and thinking".

This is question for looking for new aspects of visual ways of learning and thinking, It can contribute not only to intellectual gain(measured by transfer test and retention test) but also to creativity.

This is mainly discussed in RQ.No.4

2 Why I'm interested in this theme(Origin)

Next, I explain about self-interest for reader to be able to demystify my source of the data if I collect only the data supporting my interests.

Considering my own experience, teaching methods in education attach too much importance to Auditory-Sequential way. Step by step, verbal representation---taking notes and verbal explanation. I think it is a problem.

Because in spite of the fact that there're two types of learning styles. One is Visual-Spatial learner and the other is Auditory-Sequential learner.(Linda Silverman,1997),current education accommodate the learning style of Auditory-Sequential learner, ignoring the needs of Visual-Spatial learner. Visual-spatial learners tend to want a bird's-eye view when learning some concepts. In other words, they want to know relationships and properties of concepts like maps. I thought the lack of those spatial(abstract) learning style is a bad problem since I had read some books which affirm the spatial learning and thinking as a style of Creative and Educated people. (Tabor(2000), "Education as Developing & Using a menu of frameworks", "Education as structural cognition" in "Are you Educated?"),. Which doesn't say directly that visual-spatial learner's learning and thinking style is effective at all. But it seems to imply that to me. That is, its emphasis on divergent and abstract way of thinking as parts of important function to be Educated, makes me occur an analogy between visual-spatial way of thinking tool and divergent and abstract thinking. More meaningful, useful and effective way of presenting visual information should be introduced into real classroom. Next such questions occur to me like "what is meaningful structure of presenting visual information?". Meaningful means Creative and Intelligent. This became later one root question "what is effective presentation principle of multimedia?". Or such question also occur, "considering Creativity's feature and Visual-spatial learner's characteristics coincide with each other, is there some positive relationship between them?", this became later another root question "is there any relationship between Creativity and Visual thinking?" This is origin of this thesis and my self interests.

Is it true?

Real context of the way to introduce visual material in Education

~ History of Idea~

<Western>

From Old to middle(1974)	Recent(2000~)
	Recently, a number of researches based on cognitive science are produced in the field of intelligent tutoring system and more broad, Multimedia learning. Along with these scientific research, the field of information design contribute the effective design as designers.

<Japan>

From Old to middle	Recent(2000~)
Audio-visual learning is gradually introduced to produce better quality of understanding through material containing visual image and audio, especially electrical stimuli. Originally born as a criticism against Verbalism in beginning of 20 century.	In Japan, recent multimedia learning's definition is out-dated. Because it's based on the theory called "multi-sensory material theory"(Syunya Tanaka,1996). Its definition is the more sensory input is, the more effective learning occur. This theory is proved to wrong by recent research.

visual and verbal presentation, Most of presentation is done by verbal way in both Western and Japan. But in recent, more teachers and researchers are aware of the importance of integration of visual and verbal. The difference is that in Japan, little scientific researches exist about visual presentation. It shows that little serious attention has been paid to this field.

Pro-position; Presenting mainly verbal way is a problem because it misses Benefits from visual material

~ Evidence which prove the benefit of visual material~

Pro-Evidence1; Visualization promote Creativity so Verbal dominant way inhibit Creativity come from visualziation

The study connect both visualization and Creativity by showing how many famous creative scientists owe their discoveries to mental visualization, introducing case studies from Einstein to Kekule. (Lloyd P.Rieber,1990)

Lloyd point out that spread criticizes traditional education. because verbal

dominant way of teaching and learning might be inhibiting children's visually-based creativity.(1990)

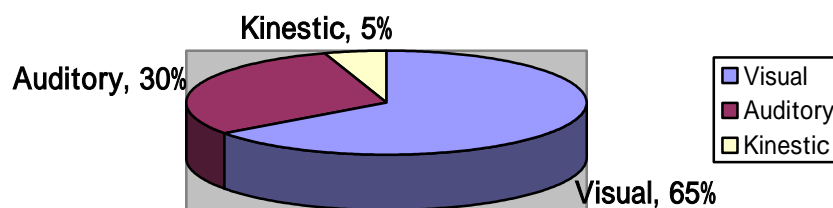
Role of visual knowledge with forms of the highest quality, it contributes to conceptual thinking ,Creativity and Problem-solving.(Arnheim,1969,Paivio,1979)

Pro-Evidence2;

65% is visual learner in the population so there are many learners who require visualization.

Material accommodate with individual difference result in effective learning. So with more visual learning, 65% learners might result in more effective learning

The big three learning style



The data from several web sites

The effectiveness of instructional strategies depends greatly on individual learner differences(Ritchie & Gimenez,1996). That is, material should be accommodated with different learning styles. In this way , the learner can generate the necessary relationship between material being presented and their prior knowledge to make learning more meaningful.(Chun,1996)

Pro-Evidence 3

Two separate exposures, visual and verbal to the same material is better than one in retention and transfer test,(Mayer,2001)

Active mental connection between different presentations of the same information enhances understanding, acquisition and memorization of learning contents.(Shnotz)

The way using pointing device is most

effective, at first,
 Circling a point twice slowly
 and stop the bottom of the point.
 Students show 99% memory remaining.

Cause 2 Survey of memory

Percentage of memory remaining

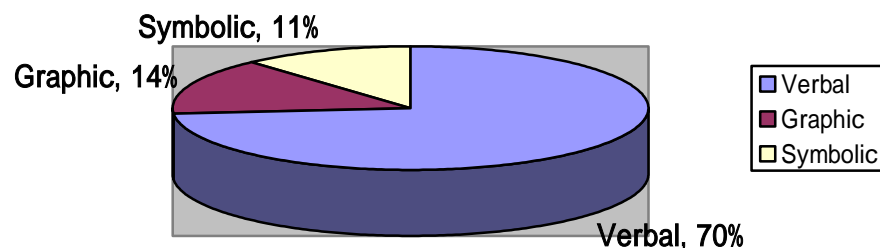
Method	3 hours	3
Text only	70%	10%
Visual only	72%	20%
Visual and Text	85%	65%

There is another empirical result, lecture with media had 20% more Q & A and 21% increase of concentration than traditional lecture (IBM's result surveying effect of audio-visual media).

Con-position; Presenting mainly verbal way isn't a problem

~The lack of visual presentation does not cause bad in higher education ~

Preference for representation style



Con-Evidence 1

Data is from the 500 student of the first year of Psychology and Educational science at the University Gent.

Data is limited, but students in higher education show a major preference for verbal information. A few students prefer graphic or symbolic information.

(Peterson, 1996; Bonk & Cummings, 1988, Martens, 1988, Mirande, et al, 1997)

This data is limited within France, Major of psychology and educational science.

So I can't generalize the tendency for verbal preference from this sample.

but if majority is verbal preference learner, majority of students might not feel difficult with current way of presentation.

Weighing Pro and Con's Evidence

I support evidence of pro-position that verbal dominance is a problem. It is true that current verbal dominant way of presentation does not cause seriously bad damage on students, because information comes to be provided by verbal way thorough books in higher education. Sooner or later, they have to get used to this

learning style. But to make full use of ability of all learners, we have to make the verbal dominance way of presentation more diverse than now. We have to accommodate more individual learners' needs taking it seriously as a problem.

Making up for the weak points of this argument

This conclusion might be seemed as my opportunism. Because of that the evidence of con-position isn't strong enough to make an argument. So in this paper's Research Question No.4, I examine the relationship between Creativity and Visual thinking & learning more strictly, introducing strong con-position.

3 What does this thesis provide you with?

Aim of this paragraph is to examine whether there is the value to read for others To examine this, I would like to clarify what reader can get from this paper.

- One is whether there is any relationship between Creativity and Visual thinking and whether it is possible to improve visual thinking with multimedia presentation.
- The other is multimedia presentation principle aiming "Intellectual gain" based on both cognitive theory and artist's intuition based on real experiences.

In the process of researching these two root question, I clarify the aim of Education, Creativity, Learning and Multimedia Learning.

So you can also know

- The exact estimation of how much is the importance, strength and effectiveness of Creativity and Multimedia Learning in the domain of Education.(in other words, Learning and Instruction)

I clarify this estimation whether they are important or not in Research Question No.1. in RQ No.1,Opportunism assumption is eliminated like both "Creativity" and "Multimedia Learning" is required in current trends in Education.

When trying to make use of fruitful research outputs of cognitive science theory for education, it is for granted that it should treat topics of "learning". But because of my lack of domain knowledge, for me, it is not for granted. So I did literature review going trace back to the old to clarify the paradigm shared with among the domain of education. In the process, I found certain value in multimedia presentation. So after reading next paragraph, you can judge exactly for what this knowledge is useful and find new aspects of "Learning problem" which Multimedia Learning contributes to as a one of solutions.

To sum up, research question No.1, It shows that Creativity and Multimedia Learning strategies based on cognitive science contributes to “self-directed learning”, which is a good solution to the problem of “Learning” that current education bear. So they partially contributes to the problem of Education. But it is for granted for high-knowledge people in the field of Creativity and Cognitive theory that the contribution of these two results in the range of “Self-Directed Learning”. Their net contribution is a little to Education.

For me, it is not granted, so research question No, 1 born.