On studying the hierarchical inter-relationships amongst challenges to implementation of Ideation tools and techniques and benefits from using Info-graphics in education

Abstract

Ideation is the capability for generating, developing, actualizing and communicating ideas. Ideation is an essential part of the design process, both in education and practice—and it's at the heart of the Design Thinking process. Design Thinking is all about breaking down barriers and removing the obstacles which typically block innovation.

Info-graphics are a great way to help people process information in a way that's most appealing, comfortable and accessible to them. This includes providing words, images, and even interactive elements to help with attention, memory, and recall processes. The paper is structured in three parts i.e. using Info-graphics in imparting online education as well as offline classroom teaching and learning. Second part deals with using Info-graphics and third part deals with psychological impact of info-graphics in education. Further the hierarchical inter- relationships amongst the benefits from them have been studied usingVAXO technique based matrices.

Keywords: Ideation techniques; Hierarchical interrelationships ; Barriers to ideation ; Info-graphics; Teaching; Learning; Visual literacy; ISM methodology

1. Introduction

Ideation is the process of generating a broad set of ideas on a given topic, with no attempt to judge or evaluate them. The main goal of an ideation session is to spark innovation and draw out a sense of creativity. This setting fosters collaboration and allows all team members to contribute creatively to idea generation. The main goal of an ideation session is to spark innovation and draw out a sense of creativity. To do this, an environment that encourages open discussion and encourages participants to think outside the box is vital. This could include lightning demos, role-playing, mind mapping, sketching, prototyping, etc., which can generate new ideas and solutions.

Info-graphics can be an effective educational tool because of their ability to break complex information into easy-to-understand components and to make dense data engaging. Teaching by info-graphics helps students to interpret visual knowledge and provide a broader and extensive body of learning and grasp in education [1].

The aim of info-graphic can be categorized into three objectives like speaking in public to Persuade, entertain and inform the audience and also obtaining the readers' attraction [2]. Additionally, research has shown that the visual communication by using info-graphic has increased the collaboration, engagement and conceptual understanding of learners [3].

2. Challenges to implementation of Ideation tools and techniques [3-10]

2.1. Inexperienced Facilitation[IF]: Ideation requires focus on the user and problem statement, keen awareness of group dynamics and purposeful steering. Team managers should always focus on developing facilitation capabilities within their team, regardless of their focus.

2.2. Uninitiated Team [UT]: To avoid fear and anxiousness, the facilitator should always prepare inexperienced teams for ideation.Uninitiated teams could very well result in frustration, negative team dynamics, conflict and dented team confidence.

2.3. Unfriendly Space[US]: Ideation sessions may need to switch from large group interaction to team spaces very quickly, ideally requiring a space which could be easily reconfigured. It is required to keep ideation spaces well lit, ventilated and free from external distraction or interference.

2.4. Unclear Goals [UG]: Goal finding or quest storming is the focus of the first two Design Thinking phases, which are the Empathize phase and the Define phase. The following phases are Ideate, Prototype and—finally—Test.

2.5. Egos and Hierarchy [E&H]: Team creativity works best when everyone is considered equal. Many ideation methods, such as Brain-walking and Brain-writing, have built-in mechanisms to prevent ego and hierarchy from overshadowing the process.

2.6. Closed-Mindedness [CM]: A closed mind will not be able to build on external stimuli. Group ideation functions best when all ideas can be expressed equally and then later mixed up in unconventional ways. This produces novel combinations or completely new ideas.

2.7. Limiting Ideas [LI]: Limiting ideas to only the very first seemingly effective-looking ones will render any group ideation session irrelevant. If time is indeed very limited, you will not want to initiate ideation sessions at all.

2.8. Early Judgment and Devil's Advocate [EJ]: This means ideas should be allowed to be expressed as is, without criticism, censure or requests for detail unless the ways they are expressed are simply not understood.

2.9. Lack of Imagination or Being too Serious/Boring [LoI]: Some organizational environments are so entrenched in statistical data, logic and rationality that people end up losing their ability to think out of the box.

2.10. Old Pattern Thinking [OPT]: With the increase in competition, higher demands and rapidly changing economic, technological and environmental factors, we cannot become comfortable with how things are for too long.

2.11. Hence proved type thinking [HPTT]: These thinking and decision-making patterns prevent venturing into the unknown where the most innovative solutions likely exist.

2.12. Groupthink [GT]: Within group settings, we tend not to want to act, think or express differently from what is perceived to be acceptable within the group. This may lead to a type of collective closed-mindedness.

2.13. Cognitive Bias[CB]: Cognitive biases are like generalizations, which individuals develop based on their experiences and according to their preferences, and become automatic reactions that people apply within certain situations.

2.14. Take Away [TA]: Successful ideation sessions depend on an experienced facilitator and ideation team, who are trained in techniques for purposely navigating around the barriers, the thinking traps and the idea killers.

3. Benefits and challenges associated with using Info-graphics for Education [11-13]

3.1 Ability to target different learning styles [ATDLS]: Some clients and stakeholders process written and verbal communications quickly. Others prefer visual or tactile methods. Info-graphics tries to inculcate the ability to target different learning styles.

3.2 Ability to hold attention [AHA]: Info-graphics helps to focused audience on what you have to say. They take what might be overwhelming amounts of facts, data, and information in text and present them in a way that is engaging and holds people's attention.

3.3 Ability to improve retention and Recall [AIRR]: This is good news for info-graphic content creators for two reasons. First, you want people to remember your content. By branding your info-graphics and using subtle but self-promotional language helps in generating future purchases.

3.4 Ability to simplify complex Topics [SCT]: Info-graphics often prove so effective in educational contexts because they use imagery to highlight, explain, or enhance text-based information.

3.5 Ability to enhance Storytelling [EST]: Info-graphics rely on storytelling and flow to carry the viewer through from the title to the last word or image on the page. It shows how each piece of information connects and why it belongs within the info-graphic narrative.

3.6 Ability to bring content marketing services for Business [ABCMS]: Storytelling also enhances recall and retention. This communication method engages both the left and right sides of the brain and creates stronger connections.

3.7 Applying Visuals for a Variety of Uses [AV]: Info-graphics can be used to apply visual aids to display information about Historical Timelines; statistics ; persuasion ; tips ; instructions ; events [recapping past events like conferences , seminars] etc.

3.8 Info-graphics in Content marketing [ICM]: Info-graphics for education focus on educating your audience on these topics is one reason we engage in content marketing in the first place.

4. ISM Methodology

Suggested by Warfield [14], ISM works with the following steps: It starts with identifying the relevant elements and pair-wise establishing the contextual relationship amongst them. Thereafter, a structural self-interaction matrix (SSIM) may be developed between two variables *i.e. i and j* establishing a "Lead to" relationship between criteria. Four symbols *viz.* V, A , X & O are used for establishing the relationships. After that, a level partition matrix can be obtained based on establishing the precedence relationships and arranging the elements in a topological order. A Mic-Mac analysis is performed categorizing the variables in to autonomous, dependent, driver and linkage category. Finally, a diagraph can be obtained.

5. **Case Example**

The factors identified in section 2 are further studied through ISM methodology.

TABLE 1: **S**structural self- interaction matrix of success factors for studying info-graphics in education

Barriers	1	2	3	4	5	6	7	8
	ATDLS	AHA	AIRR	SCT	EST	ABCMS	AV	ICM
ATDLS		X	V	V	V	V	V	V
AHA			V	X	V	V	X	V
AIRR				V	V	V	V	V
SCT					V	V	X	V
EST						V	V	V
ABCMS							V	V
AV								V
ICM								

Explanation: This SSIM matrix is the viewpoint of authors. It is seen that visual info-graphics connects to various phases of mind. If you can describes complex topics through visual info-graphics it helps to explain the topics more clearly to audience in the form of a story. It enhances your story telling ability. Like for example, a physics experiment or invention could be a complicated scientific topic which students usually hesitate to cram and remember but if you can make it interesting through a story telling, they may find it interesting. Also we have heard that a picture is worth a thousand words. It also increases your content making and marketing ability as it simplies and at the same time enhances the pictorial value of the content through attractive, sensible info-graphics.

Table 2: Initial reachability matrix of success factors for studying info-graphics in education

Barriers	1	2	3	4	5	6	7	8
	ATDLS	AHA	AIRR	SCT	EST	ABCMS	AV	ISCM
ATDLS	1	1	1	1	1	1	1	1
AHA	1	1	1	1	1	1	1	1
AIRR	0	0	1	1	1	1	1	1
SCT	0	1	0	1	1	1	1	1
EST	0	0	0	0	1	1	1	1
ABCMS	0	0	0	0	0	1	1	1
AV	0	1	0	1	1	1	1	1
ISCM	0	0	0	0	0	0	0	1

Table 3: Final reachability matrix of success factors for studying info-graphics in education

Barriers	1	2	3	4	5	6	7	8	D.P
	ATDLS	AHA	AIRR	SCT	EST	ABCMS	AV	ISCM	
ATDLS	1	1	1	1	1	1	1	1	8
AHA	1	1	1	1	1	1	1	1	8
AIRR	0	0	1	1	1	1	1	1	6
SCT	0	1	0	1	1	1	1	1	6
EST	0	0	0	0	1	1	1	1	4
ABCMS	0	0	0	0	0	1	1	1	3
AV	0	1	0	1	1	1	1	1	4

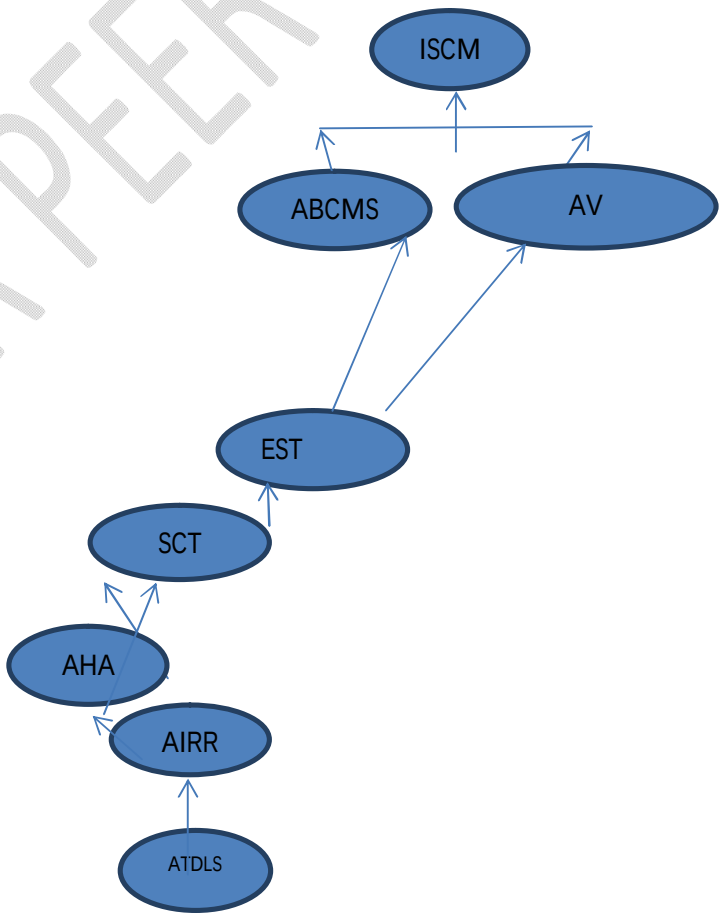
ISCM	0	0	0	0	0	0	0	1	1
De .P.	2	4	3	5	6	7	7	8	

Possible sequence: ISCM→AV, ABCMS→ EST →SCT→AHA→AIRR→ATDLS

Table 4: Driving Power & Dominance Diagram (MICMAC analysis)

-→ Driving power	8		Drivers ATDLS		AHA				**Linkage**
	7								
	6			AIRR		SCT			
	5								
	4		Autonomous			EST		AV	Dependent
	3						ABCMS		
	2								
	1								ISCM
		1	2	3	4	5	6	7	8
Dependence power --→									

ISM DIAGRAPH



6. Case example

14 challengesin section 2.2 are now been studied with the help of ISM methodology.

Table 4: SSIM for pair wise relationship amongst challenges to implementation of ideation tools and techniques

S. No.	Barriers	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		IF	UT	US	UG	E&H	CM	LI	EJ	LoI	OPT	HPTT	GT	CB	TA
1	IF		A	A	A	A	A	A	A	A	A	A	A	A	A
2	UT			A	A	A	A	A	A	A	A	V	X	A	A
3	US				X	X	X	X	X	X	X	X	X	X	X
4	UG					X	X	X	X	X	X	X	X	X	X
5	E&H						A	A	A	A	A	X	X	X	X
6	CM							A	A	A	X	X	X	X	X
7	LI								V	V	V	X	X	X	X
8	EJ									X	A	X	X	X	X
9	LoI										X	X	X	X	X
10	OPT											X	X	X	X
11	HPTT												V	V	V
12	GT													A	A
13	CB														X
14	TA														

Table 5: IRM is left as an exercise for readers.

Table 6 :FRM for pair wise relationship amongst challenges to implementation of ideation tools and techniques

S. No.	Barriers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
		IF	UT	US	UG	E&H	CM	LI	EJ	LoI	OPT	HPTT	GT	CB	TA	D.P
1	IF	1	0	0	00	0	0	0	0	0	0	0	0	0	0	1
2	UT	1	1	0	0	0	0	0	0	0	0	1	1	0	0	4
3	US	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
4	UG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
5	E&H	1	1	1	1	1	0	0	0	0	0	1	1	1	1	9
6	CM	1	1	1	1	1	1	0	0	0	1	1	1	1	1	11
7	LI	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
8	EJ	1	1	1	1	1	1	0	1	1	0	1	1	1	1	12
9	LoI	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13
10	OPT	1	1	1	1	1	1	0	1	1	1	1	1	1	1	13
11	HPTT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14

12	GT	1	1	1	1	1	1	1	1	1	1	0	1	0	0	11
13	CB	1	1	1	1	1	1	1	1	1	1	0	1	1	1	13
14	TA	1	1	1	1	1	1	1	1	1	1	0	1	1	1	13
	De.P	14	13	12	12	12	11	7	10	10	10	10	13	11	11	

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