

## A Study of Using Instructional Media to Enhance Scientific Process Skill for Young Children in Child Development Centers in Northeastern Area

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**[Abstract]** The purposes of this research were to study 1) the criteria used to determine learning areas relevant to scientific process skill for young children; 2) the scientific process skill promoted by using instructional media; 3) the criteria of learning resources selecting, instructional media selecting, instructional media resources and types of instructional media; 4) the problems and the obstacles of using local wisdom instructional media in learning management and; 5) the problems and obstacles of inventing scientific instructional media using local wisdom in learning management. The population used in this research was 394 of child caregiver teachers in child development centers and the data collected through the questionnaire designed by the researchers. The research results were as follow: 1) The first criterion that child caregiver teachers used to determine learning areas relevant to scientific process skill for young child was the content related to the children follow by the content appropriated with age and development. 2) The scientific process skill promoted by using instructional media was rated in order by observation skill and comparison skill respectively. 3) The criteria of learning resources selecting, instructional media selecting, instructional media resources and types of instructional media found; 4) The problems and the obstacles of using local wisdom instructional media in learning management were the durability of the instructional media and the lack of knowledge of child caregiver teachers in using local wisdom in learning management. 5) The problems and obstacles of scientific instructional media invention using local wisdom were teachers' lack of instructors and lack of ideas in instructional media invention.

**[Keywords]** instructional media; scientific process skill; local wisdom; young children

### Introduction

The instructional media used in learning activities plays the significant role in young children learning. At this stage of life, the children will learn effectively through their 5 senses beginning from the surrounded environment and real experiences. Therefore, instructional media or activities should meet their learning behavior to promote the development and form their characteristic, behavior and the growth of physical, mental and intellectual. Due to their learning nature such as curiosity, participating in the activities that enhance learning skill at this early year of life will promote the children to develop the skills needed to become good and effective citizen.

Scientific process skills are the basic skills that encourage young children to develop their logical thinking, knowledge seeking and problem solving skills. These basic skills are important and should be formed in young children so that they will develop into 7 areas of process skills described as follow: 1) Observing 2) Classifying 3) Measuring 4) Communicating 5) Inferring 6) Relating space-space and space-time and 7) Calculating.

In Northeastern area consisted of 7,321 of child development centers under the responsible of the Department of Local Administration with the number of 13,955 child caregiver teachers and 275,005 of students which are the most part of Thailand. According to the result from the pilot survey and the experiences that researchers who teach in the Cooperation Project between Suan Dusit Rajabhat University and the Department of Local Administration, the problems in activities management and using instructional media to enhance scientific learning for young children in child development centers in the Northeastern area were from using activities or instructional media specified in the core curriculum without applying in materials and local culture as the instructional media. This problem was the reason of unsuccessful results in learning process instructional media and activities. This research will resolve these

problems by applying materials, local wisdom and local culture as the instructional media used in learning management in child caregiver centers in Northeastern area to achieve the effective learning process for young children.

### **Objectives**

To study the use of instructional media in learning management to enhance scientific skill for young children in child development centers in Northeastern area in the aspects as follow: 1) The criteria used to determine learning areas relevant to scientific process skill for young children. 2) The scientific process skill promoted by using instructional media. 3) The criteria of learning resources selecting, instructional media selecting, instructional media resources and types of instructional media. 4) The problems and the obstacles of using local wisdom instructional media in learning management. 5) The problems and obstacles of inventing scientific instructional media using local wisdom.

### **Methodology**

This survey research consisted of 394 of child caregiver teachers in child development centers under the responsible of the Department of Local Administration in Northeastern area. The population were from the following provinces: 66 persons from Udon Thani Province, 60 persons from Khon Kaen Province, 30 persons from Nakhon Phanom Province, 20 persons from Sakon Nakhon Province, 20 persons from Nong Khai Province, 20 persons from Nong Bua Lamphu Province, 20 persons from Loei Province, 20 persons from Kalasin Province, 20 persons from Roi Et Province, and 20 persons from Mahasarakham Province. The statistics used to analyze the data were the percentage and mean.

### **Findings**

#### ***General Information***

More than half of the respondents were female (386 or 97.47 percent) and the remaining were male (10 or 2.53 percent). According to age group, 31-40 age were 156 (39.39 percent), 20-30 age were 128 (32.32 percent), 41-50 age were 98 (24.75 percent), Above 51 age were 8 (2.02 percent) and less than 20 age were 2 (0.51 percent) respectively. According to education background of the respondents, most of them were graduated in High School Level or Vocational Certificate Level (146 or 36.87 percent) follow by Bachelor Degree (140 or 35.35 percent), Diploma or High Vocational Certificate (98 or 24.75 percent), Master Degree (4 or 1.01 percent), and Secondary School Level (2 or 0.51 percent) respectively.

Considering experience of working in the child development center, most of the respondents had 1-5 years of experience (182 or 45.96 percent) follow by 11 – 15 years of experience (82 or 20.71 percent), 6 – 10 years of experience (26 or 16.67 percent), 16 – 20 years of experience (40 or 10.10 percent), less than 1 year of experience (14 or 3.54) and more than 20 years of experience (10 or 2.53 percent) respectively. Most of the respondents worked as child caregiver teachers (350 or 88.38 percent), Chief of center (20 or 5.05 percent) and others such as teaching assistant or staff (24 or 6.06 percent).

#### ***Learning Experiences Management in using instructional media to enhance scientific learning management for young children***

The data of learning experiences management in using instructional media to enhance scientific learning for young children are shown in Table 1-6. From Table 1: According to the criteria used to determine learning areas relevant to scientific process skill for young children, the respondents concerned in the aspect of content related to child's world (304 or 76.77 percent) follow by age and development appropriate (298 or 75.25 percent), content related to scientific learning area (256 or 64.65 percent), content related to child's interests (250 or 63.13 percent), multiple uses (184 or 46.46 percent) and economical and nexpensive (140 or 35.35 percent) respectively.

**Table 1.** *Quantity and Percent of the responses in the Criteria Used to Determine Learning Areas Relevant to Scientific Process Skill for Young Children*

Criteria used to determine learning areas	Quantity	Percent	Rank
1. Related to scientific learning area	256	64.65	3
2. Related to child's interests	250	63.13	4
3. Related to child's world	304	76.77	1
5. Age and development appropriate	294	75.25	2
6. Convenient to use	140	35.35	7
7. Economical and Inexpensive	176	44.44	6
8. Multiple uses	184	46.46	5

From Table 2, according to the scientific process skill promoted by using instructional media, the highest level was Observation Skill (378 or 95.45 percent), follow by Comparison Skill (260 or 65.66), Classifying Skill (236 or 59.60 percent), Measuring Skill (148 or 37.37 percent), Communication Skill (106 or 26.77), Space and Space- Space and Time (80 or 20.20 percent) and Inferring Skill (78 or 19.70 percent) respectively.

**Table 2.** *Quantity and Percent of the Responses in The Scientific Process Skill Promoted By Using Instructional Media*

Skills	Quantity	Percent	Rank
1. Observation Skill	378	95.45	1
2. Comparison Skill	260	65.66	2
3. Classifying Skill	236	59.60	3
4. Measuring Skill	148	37.37	4
5. Communication Skill	106	26.77	5
6. Inferring Skill	78	19.70	7
7. Space and Space- Space and Time	80	20.20	6

From Table 3, according to the criteria of learning resources selecting to use in scientific learning management, the respondents considered the Natural Learning Resource as the highest aspect (256 or 64.65 percent, follow by Local Learning Resource (208 or 52.53 percent), In-School Learning Resource (178 or 44.95 percent), Materials and Equipments (170 or 42.93 percent), Newspaper (132 or 33.33 percent), Person (108 or 27.27 percent), Electronic Media (80 or 20.20 percent) and Computers (74 or 18.69 percent) respectively.

**Table 3.** *Quantity and Percent of the Response in the criteria of learning resources selecting to use in scientific learning management*

Learning Resources	Quantity	Percent	Rank
1. Newspaper	132	33.33	5
2. Electronic Media	80	20.20	7
3. Computers	74	18.69	8
4. Materials and Equipments	170	42.93	4
5. In- School Learning Resource	178	44.95	3
6. Local Learning Resource	208	52.53	2
7. Person	108	27.27	6
8. Natural Learning Resource	256	64.65	1

From Table 4, according to the criteria of instruction media selecting to use in scientific learning management, the respondents concerned the highest level in the aspect of Safety (308 or 77.78 percent), follow by Developmental Appropriateness (296 or 74.75 percent), Attract child's interests (278 or 70.20 percent), Related to the objective of learning experience (264 or 66.67 percent), Multiple uses (186 or 46.97percent), Inexpensive (170 or 42.93), Simply to use (160 or 40.40), Durable and Light Weight (170 or 42.93 percent), Tranformable (80 or 20.20 percent) and Dimensionally (54 or 13.64 percent) respectively.

**Table 4.** *Quantity and Percent of the Response in the criteria of instruction media selecting to use in scientific learning management*

Criteria of instruction media selecting	Quantity	Percent	Rank
1. Developmental Appropriateness	296	74.75	2
2. Related to the objective of learning experience	264	66.67	4
3. Safety	308	77.78	1
4. Multiple uses	186	46.97	5
5. Simply to use	160	40.40	7
6. Inexpensive	170	42.93	6
7. Attract child's interests	278	70.20	3
8. Durable and light weight	122	30.81	8
9. Transformable	80	20.20	9
10. Dimensionally	54	13.64	10

From Table 5, according to the criteria of instructional media resources using in scientific learning management, most of the media were from Self-invented (342 or 86.36 percent), follow by Self-supported (240 or 60.61 percent), Original affiliation supported (200 or 50.51 percent), Parents-supported (138 or 34.85 percent) and Community/Company supported (64 or 16.16 percent) respectively.

**Table 5.** *Quantity and Percent of the Response in the Criteria of instructional media resources using in scientific learning management*

Resources	Quantity	Percent	Rank
1. Self-invented	342	86.36	1
2. Self-supported	240	60.61	2
3. Parents Supported	138	34.85	4
4. Community/Company Supported	64	16.16	5
5. Original affiliation supported	200	50.51	3

From Table 6, according to the types of instructional media use in scientific learning management, the respondents considered Real Objects as the highest level (272 or 68.69 percent), follow by Stories (226 or 57.07 percent), Toys (220 or 55.56 percent), Flash Cards/Printed Visuals (218 or 55.05 percent), Games (178 or 44.95 percent), Demonstration Kits/Simple Demo Set (162 or 40.91 percent), Picture Book/Reading Book (154 or 38.89 percent), Music (150 or 37.88 percent), Rhymes (130 or 32.83 percent) Animated Visual (120 or 30.30 percent), Audiovisual Aids (102 or 25.76 percent), Scientific Equipments (74 or 18.69 percent), Computers (62 or 15.66 percent) and Recorded Audio (48 or 12.12 percent) respectively.

**Table 6.** *Quantity and Percent of the Response in the types of instructional media use in scientific learning management*

Types	Quantity	Percent	Rank
1. Real Objects	272	68.69	1
2. Imitated Objects	178	44.95	5
3. Flash Cards/Printed Visuals	218	55.05	4
4. Animated Visual	120	30.30	10
5. Picture Book/Reading Book	154	38.89	7
6. Recorded Audio	48	12.12	14
7. Audiovisual Aids	102	25.76	11
8. Demonstration Kits/Simple Demo Set	162	40.91	6
9. Stories	226	57.07	2
10. Music	150	37.88	8
11. Games	178	44.95	5
12. Rymes	130	32.83	9
13. Computers	62	15.66	13
14. Toys	220	55.56	3
15. Scientific equipments	74	18.69	12

The data of the problems and the obstacles of using local wisdom instructional media in learning management are shown in Table 7-8. From Table 7: According to the problems and the obstacles of using local wisdom instructional media in learning management, the respondents stated that the Lack of Durability was the highest concerns (210 or 53.03 percent), follow by the Lack of knowledge and understanding in using local wisdom in learning management (152 or 38.38 percent), The invented media were unattractive to child's interests (106 or 26.77 percent), Lack of understanding in the process of using local wisdom instructional media in learning management (88 or 22.22 percent), The invented media were irrelevant to the content (70 or 17.68 percent), Lack of instructional media suitable for content in learning (62 or 15.66 percent), and Never used local wisdom instructional media in learning management (34 or 8.59) respectively.

**Table 7.** *Quantity and Percent of the Responses in the Problems and the obstacles of using Local Wisdom Instructional Media in Learning Management*

Problems and Obstacles	Quantity	Percent	Rank
1. Never used local wisdom instructional media in learning management.	34	8.59	7
2. Lack of understanding in the process of using local wisdom instructional media in learning management.	88	22.22	4
3. Lack of instructional media suitable for content in learning activities.	62	15.66	6
4. Lack of knowledge and understanding in using local wisdom in learning management	152	38.38	2
5. The invented media were irrelevant to the content	70	17.68	5
6. The invented media were unattractive to child's interests	106	26.77	3
7. Lack of Durability	210	53.03	1

From Table 8, according to the problems and the obstacles in scientific instructional media invention using local wisdom in learning management, the respondents stated that the Lack of instructors was the

first problem (178 or 44.95 percent), follow by Lack of ideas in instructional media invention (164 or 41.41 percent), Lack of knowledge and understanding in scientific learning management (138 or 34.85 percent), Lack of ideas to use materials in instructional media invention (134 or 33.84 percent), Lack of knowledge and understanding in instructional media invention (112 or 28.28 percent), Lack of confidence in instructional media invention (108 or 27.27 percent) and The difficulty in materials finding in instructional media invention (86 or 21.72 percent) respectively.

**Table 8.** *Quantity and Percent of the Response in the Aspect of the Problems and the Obstacles of Scientific Instructional Media Invention Using Local Wisdom in Learning Management*

Problems and Obstacles	Quantity	Percent	Rank
1. Lack of knowledge and understanding in scientific learning management	138	34.85	3
2. Lack of ideas in instructional media invention	164	41.41	2
3. Lack of knowledge and understanding in instructional media invention	112	28.28	5
4. Lack of confidence in instructional media invention	108	27.27	6
5. Lack of instructors	178	44.95	1
6. Lack of ideas to use materials in instructional media invention	134	33.84	4
7. The difficulty in materials finding in instructional media invention	86	21.72	7

### Conclusion

The findings from this research can be concluded that the instructional media which promote the scientific skill for young children mostly from Natural Learning (256 or 64.65 percent, follow by Local Learning Resource (208 or 52.53 percent), In-School Learning Resource (178 or 44.95 percent), Materials and Equipments (170 or 42.93 percent), Newspaper (132 or 33.33 percent), Person (108 or 27.27 percent), Electronic Media (80 or 20.20 percent) and Computers (74 or 18.69 percent) respectively.

The survey results showed that instructional media resources that enhancing thinking skill and scientific skill used in scientific learning management were the Natural Learning Resource as the highest aspect (256 or 64.65 percent, follow by Local Learning Resource (208 or 52.53 percent), In-School Learning Resource (178 or 44.95 percent), Materials and Equipments (170 or 42.93 percent), Newspaper (132 or 33.33 percent), Person (108 or 27.27 percent), Electronic Media (80 or 20.20 percent) and Computers (74 or 18.69 percent) respectively.

According to the criteria of instruction media selecting to use in scientific learning management, the respondents concerned the highest level in the aspect of Safety (308 or 77.78 percent), follow by Developmental Appropriateness (296 or 74.75 percent), Attract child's interests (278 or 70.20 percent), Related to the objective of learning experience (264 or 66.67 percent), Multiple uses (186 or 46.97percent), Inexpensive (170 or 42.93), Simply to use (160 or 40.40), Durable and Light Weight (170 or 42.93 percent), Transformable (80 or 20.20 percent) and Dimensionally (54 or 13.64 percent) respectively.

In the aspect of instructional media resources using in scientific learning management, most of the media were from Self-invented (342 or 86.36 percent), follow by Self-supported (240 or 60.61 percent), Original affiliation supported (200 or 50.51 percent), Parents-supported (138 or 34.85 percent) and Community/Company supported (64 or 16.16 percent) respectively.

The types of instructional media enhancing thinking skill and scientific skill used in learning management was Real Objects as the highest level (272 or 68.69 percent), follow by Stories (226 or 57.07 percent), Toys (220 or 55.56 percent), Flash Cards/Printed Visuals (218 or 55.05 percent), Games (178 or 44.95 percent), Demonstration Kits/Simple Demo Set (162 or 40.91 percent), Picture Book/Reading Book (154 or 38.89 percent), Music (150 or 37.88 percent), Rhymes (130 or 32.83 percent) Animated Visual



(120 or 30.30 percent), Audiovisual Aids (102 or 25.76 percent), Scientific Equipments (74 or 18.69 percent), Computers (62 or 15.66 percent) and Recorded Audio (48 or 12.12 percent) respectively.

The results also showed that in the aspect of problems and obstacles of using local wisdom instructional media in learning management, the respondents stated that the Lack of Durability was the highest concerns (210 or 53.03 percent), followed by the Lack of knowledge and understanding in using local wisdom in learning management (152 or 38.38 percent), The invented media were unattractive to child's interests (106 or 26.77 percent), Lack of understanding in the process of using local wisdom instructional media in learning management (88 or 22.22 percent), The invented media were irrelevant to the content (70 or 17.68 percent), Lack of instructional media suitable for content in learning (62 or 15.66 percent), and Never used local wisdom instructional media in learning management (34 or 8.59) respectively.

According to the problems and the obstacles of scientific instructional media invention using local wisdom in learning management, the respondents stated that the Lack of instructors was the first problem (178 or 44.95 percent), followed by Lack of ideas in instructional media invention (164 or 41.41 percent), Lack of knowledge and understanding in scientific learning management (138 or 34.85 percent), Lack of ideas to use materials in instructional media invention (134 or 33.84 percent), Lack of knowledge and understanding in instructional media invention (112 or 28.28 percent), Lack of confidence in instructional media invention (108 or 27.27 percent) and The difficulty in materials finding in instructional media invention (86 or 21.72 percent) respectively.

### Discussion

The use of instructional media of child caregiver teachers: Most of child caregiver teachers consider the criteria to determine learning areas and learning resources. The learning areas should relate to child's world and appropriate to age and development. Instructional media and learning resources should be the real objects. Learning management should refer to learning principle according to Waldorf Education, Whole Language Approach and Piaget's Cognitive Development Theory which states that enhancing young children to continuously interact with environment will promote cognitive development and the harmoniously lifelong learning. The learning should allow children to learn about themselves and surrounded environment. Furthermore, the child caregiver teachers also concern about developing observation skill and comparison skill which allow children to learn through basic scientific skills as stated in Piaget's Cognitive Development Theory that the development occurs appropriately step by step at the age of newborn- 6. The first stage of learning in cognitive theory is Sensorimotor Stage and the second is Preoperational Stage which focusing on the learning by experience through 5 senses. Therefore, when teachers support children to learn by interacting with environment will promote the effective learning for them (Chuleekorn Sa-ngoansri, p.41)

In the aspect of using local wisdom instructional media in learning management, the child caregiver teachers still have the problems in significant areas: the Lack of Durability in instructional media invention, the Lack of understanding in the process of using local wisdom instructional media in learning management and The invented media were unattractive to child's interests. In the aspect of inventing scientific instructional media using local wisdom, the results show that the problems for the child caregiver teachers were the Lack of instructors, Lack of ideas in instructional media invention and Lack of knowledge and understanding in scientific learning management. The research results can be described that due to the newness and the unfamiliarity of merging the knowledge of local wisdom and the knowledge of learning management in education which has been in Thailand since 2007, the problems and the obstacles in using local wisdom instructional media in learning management and the inventing scientific instructional media using local wisdom are still significant for child caregiver teachers.

There are some studies on the effects of using local wisdom and the concept of sufficient economy on child development. The research of Pornpatra Niyomchai on the multiple intelligences in young children who experienced in the local wisdom learning resources shows that the local wisdom did develop the multiple intelligences in young children. (Pornpatra Niyomchai, 2010). In the research of Sudthipan Dhirapongse (2009), the result reveals that the parents nurture their children with the concept of sufficient

economy increase the logical thinking ability in young children which effect their own development as well as in the research of Busaba Intr-Ngam (2009) that shows the effect on logical thinking ability from using the concept of sufficient economy in learning management. Sujinda Kajornrunsilpa (2010) states that continuously using the new theory farming, Thai local wisdom and sufficient economy in learning management for young children provide directed experience that appropriate to the context of their school or community. However, these researches emphasis the child caregiver teachers just the knowledge and the perception in this field, not the proficiency and the proper use of instructional media. Therefore, the child caregiver teachers are still facing the lack of proficiency and ideas in instuctional media invention.

There are some of teachers and educators tends to study in integrated education that combine knowledge and local wisdom. Still, the newness is the problem in instructional media invention as the lack of knowledge, the lack of durability, the attractiveness and the relation between instructional media and local wisdom that suitable for most of the teachers. There are some studies on the effects of using local wisdom and the concept of sufficient economy on child development. The research of Pornpatra Niyomchai on the multiple intelligences in young children who experienced in the local wisdom learning resources shows that the local wisdom did develop the multiple intelligences in young children. (Pornpatra Niyomchai, 2010). In the research of Sudthipan Dhirapongse (2009), the result reveals that the parents nurture their children with the concept of sufficient economy increase the logical thinking ability in young children which effect their own development.

This research result also shows that the problems and the obstacles of inventing scientific instructional media using local wisdom are the Lack of instructors, Lack of ideas in instuctional media invention and Lack of knowledge and understanding in scientific learning management. These problems can be resolved by cultivate and support the teachers' knowledges and attitudes. This will help the child caregiver teachers to relate the learning management with their everyday life and frequently use local instructional media. Once the child caregiver teachers begin to use local instructional media continuously, they become skillful in instructional media invention and bring about the good quality of the media. Also, this will help the child caregiver teachers to connect the area of learning better and easier. For the effective learning management, the child caregiver teachers must relate the learning with the way of life and the community that the children live in so that they will be proud and grateful for their community which affects their self-development. This result accords with the research of Busaba Intr-Ngam (2009) that shows the effect on logical thinking ability from using the concept of sufficient economy in learning management. Also, Sujinda Kajornrunsilpa (2010) states that continuously using the new theory farming, Thai local wisdom and sufficient economy in learning management for young children provide directed experience that appropriate to the context of their school or community.

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