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"What's wrong with this tree?": Integrating effective communication with tree care instruction

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"What's wrong with this tree?": Integrating effective communication with tree care instruction

Abstract

An instructional development project using an exhibit illustrating improper tree care is integrated with the model of the events of instruction (Gagne & Briggs, 1979) and with the model of the stages of the innovation-decision process (Rogers, 1983). These two models are correlated and related to the field of arboriculture. An arborist using these correlated models in conjunction with the "What's Wrong With This Tree" exhibit will be able to provide effective and efficient instruction on the topic of proper tree care.

"What's Wrong With This Tree":
Integrating Effective Communication
With Tree Care Instruction

A Graduate Project
Submitted to the
Department of Curriculum and Instruction
In Partial Fulfillment
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Master of Arts in Education
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by
Rick Tagtow
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Integrating Effective Communication

With Tree Care Instruction

Has been approved as meeting the research paper requirement for the degree of Master of Arts in Education.

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7/15/88

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Abstract

An instructional development project using an exhibit illustrating improper tree care is integrated with the model of the events of instruction (Gagne & Briggs, 1979) and with the model of the stages of the innovation-decision process (Rogers, 1983). These two models are correlated and related to the field of arboriculture. An arborist using these correlated models in conjunction with the "What's Wrong With This Tree" exhibit will be able to provide effective and efficient instruction on the topic of proper tree care.

"What's Wrong With This Tree":

Integrating Effective Communication

With Tree Care Instruction

Many arborists, particularly those employed within the public sector, spend a great deal of time teaching the techniques of proper tree care. Most who are involved in this teaching process are experts in the practice of tree care but few would consider themselves well versed on the subjects of efficient instruction or effective communication. Combining the fields of communication, instruction, and tree care should help arborists inform the public and improve the urban forest resource.

This paper discusses an instructional development project designed to integrate two theories of communication and instruction with an exhibit illustrating a variety of tree care problems. The project follows the instructional development format and is divided into three main phases: analysis, design and evaluation. The major emphasis of the project is centered on the design phase of instructional development and specifically on the instructional strategies.

Analysis

Needs Assessment

Personal Observations

Before an instructional program is developed it is necessary to assess the current dissemination of knowledge and determine whether or not it is optimum (Dick & Carey, 1985). A need exists if the current level of public knowledge is less than the available information allows.

Personal experience and a review of the literature indicate that arboriculture represents a field in which rapid advances in techniques and principles have outstripped the public's ability to keep current (Tagtow, 1988). This observation implies the need for instructional programs aimed at public education in the various facets of tree care.

Content Analysis

Exhibit Tree

A popular educational tool that has been used throughout Iowa is the "What's Wrong With This Tree" tree exhibit (Tagtow, 1987). Lectures on this exhibit at conferences and other professional meetings have

resulted in many favorable responses and numerous requests for additional information.

Although the actual exhibit is simple enough, it incorporates a number of communications and educational media principles that are well supported by professional research. The exhibit acts as a model and, as such, is a very effective medium for demonstrating the principles and techniques of tree care (Heinich, Molenda & Russell, 1985).

Learner Analysis

Generalizations About Learners

The learners who interact with this exhibit represent a cross section of the general public. The exhibit is designed for use by school children from fourth to twelfth grade and by interested adults. It is assumed that the learners have at least a mild interest in trees.

Specifics About Learners

In order to effectively and efficiently participate in the transfer of knowledge at this exhibit it is assumed that the learners will possess the following attributes:

1. Average sight and hearing abilities.
2. Minimum of third grade education and reading abilities.
3. Potentially field dependent cognitive learning style.

Objectives

Because of the flexibility inherent within the exhibit tree, individual learners have the potential to accomplish any combination of a number of objectives. Depending upon their specific interests, time spent at the exhibit, and level of motivation, the learners may achieve any of the following objectives after experiencing the "What's Wrong With This Tree" exhibit:

1. List the three steps needed to properly remove the weight of a branch from a tree.
2. Describe the differences between a flush cut, stub and proper cut.
3. Describe how to determine the location for a proper cut when pruning a tree.
4. Define a branch collar and a branch bark ridge.
5. List five types of branches that should be pruned.
6. Explain the importance of a central leader.

7. List three indications of improper staking.

8. Explain the effects of girdling and list four potential causes of girdling.

9. Explain the importance of planting depth and back fill materials.

10. Describe the effects of attachments to trees.

Goals

The goals that may be attained through the proper use of the "What's Wrong With This Tree" tree exhibit include the following:

1. Teach the learners the techniques and principles of proper tree care.

2. Educate the public as to the need for proper tree care if urban trees are to flourish.

3. Develop a sense of respect, among the public, for urban trees as living creatures surviving under extremely stressful conditions.

Design

Media Selection

The exhibit is, in fact, built around a freshly cut live tree. The tree is labeled with a large sign asking "What's Wrong With This Tree?" and possesses a number of attributes generally associated with improper

tree care and poor natural growth habits. In addition to the tree itself and the sign, other components of the exhibit include a handout listing the known problems found on the exhibit tree and various tree care brochures and pamphlets.

Among the characteristic problems that may be shown in this exhibit are:

1. No central leader or leader topped.
2. Girdled trunk or limb.
3. Crooked trunk.
4. Poor soil (sand).
5. Attached fixtures (sign nailed, bolts, cable, rope).
6. Injured bark (mower blight, string trimmer injury).
7. Stripped bark (from heavy branch falling after a top cut).
8. Flush cut.
9. Stubs.
10. Exposed root / severed root.
11. Poor species.
12. Dog chain.
13. Plastic twine tie.

14. Unprotected wire for staking.
15. Leaning.
16. Narrow crotch / poor branching habit.
17. Rubbing limbs.
18. Broken limbs.
19. Insect or disease infestation.
20. Planted too deep.
21. Improper staking (too tight, rubbing stake, tie girdle).

Instructional Strategies

Instructional Events

One way in which this exhibit lends itself to effective teaching of proper tree care techniques is illustrated by the nine events of instruction, a model that characterizes the nature of the learning process (Gagne & Briggs, 1979). Learning is accomplished when the student internalizes the concepts provided by the instructor or exhibit or both.

The instructor purposely arranges the material and manipulates the exhibit in an effort to externally support the internal learning process. The events of instruction provide a guideline to ensure that learning

progresses in an orderly fashion (Smaldino, January/February, 1988).

1. Gaining attention.
2. Informing learners of the objectives.
3. Stimulating recall of previous learning.
4. Presenting new information.
5. Providing "learning guidance".
6. Eliciting performance.
7. Providing feedback to the learner.
8. Assessing performance.
9. Enhancing learning retention and transfer.

The order of these events is typical of the learning process but is by no means invariable. Some events may be supplied by the learners themselves and thus omitted or the order may be rearranged to suit various audiences or exhibit conditions.

As instruction is given and the learners progress through the various events, the instructor will likely be involved to varying degrees. Some events will require active participation by the instructor as new information is provided or responses sought. Other events will require little involvement as, for example,

when the learners assess their own performance by comparing their list of tree problems with the handout list.

In an exhibit setting it can be expected that, at any given time, a number of different learners will be at various different event stages in the learning process. The instructor should act to aid the learner and facilitate the learning process while being careful not to become a distraction.

Although each of Gagne's events of instruction may be accomplished by the learner without the assistance of the instructor, it is important that all of the events be considered and understood so that they may be supplied as needed. Past experience with this exhibit provides examples for each event.

Gain attention. Potential learners must first be enticed into interacting with the exhibit and instructor (Fleming & Levie, 1978). Who can resist the temptation to answer the question posed by the sign asking "What's Wrong With This Tree?" or the challenge of competing with the experts? The sign and the tree itself serve as excellent attention-getters.

Inform learners of the objectives. The objectives of the exhibit and associated learning may not be obvious to all of the learners (Smaldino, May/June, 1988). Some may assume that it is only a game and, without further encouragement, will compare their list of tree problems with the master list and leave without realizing that instruction is forthcoming or available. Even after participating in instruction, some will not be sure what they have learned unless the objectives have been clearly stated.

The instructor will have numerous opportunities to tailor objectives to individual learners or groups of learners as a dialogue develops or the learners ask questions relating to specific problems with the exhibit tree. For example, if a learner asks a question about a flush cut, the instructor could first discuss and then demonstrate how to make a proper pruning cut.

Stimulate recall of previous learning. Learning is essentially the internalization of new concepts. The concepts must not only be collected, but also connected for effective learning to take place (Smaldino, July/August, 1988). Therefore, previously learned information, perhaps learned only moments before,

must be continually recalled and synthesized with new information.

Often this recall is stimulated by a question that relates to previous information and leads to new material. An example would be reminding the learners of the branch bark ridge and the branch collar before describing the method for locating a proper pruning cut.

Present new information. Obviously, most learners will desire new information and the instructor can isolate various tree care principles, direct the attention of the audience and selectively discuss them (Smaldino, in press). By marking or pointing to the object of discussion, distractions may be minimized (Fleming & Levie, 1978). Likewise by beginning with obvious examples, smaller, less apparent features can more readily be visualized.

Describing branch collars or branch bark ridges again provides a good example. Pointing out a large collar or prominent ridge will help the learners determine the less obvious locations on smaller branches or different species trees. The exhibit tree

itself, then, provides a large array of possibilities for providing new information.

Provide "learning guidance." If the learner does not immediately understand the new information, the instructor must provide guidance either by directly restating the information or by providing clues, hints or questions (Smaldino, in press). If the information is of an arbitrary nature, repeating the instruction is called for. If the knowledge requires a definite line of logical reasoning that will result in the correct solution of the problem, then indirect hints would be preferable.

Once again, the location of a proper pruning cut provides an excellent example. If the learner cannot remember the term "bark ridge", then hinting will not likely solve the problem and a restatement of terms is in order. If, however, the learner cannot remember where to make the proper cut, then reviewing the location of the bark ridge and branch collar might stimulate recall of the cut location.

Elicit performance. The learners should now be able to understand the principles that have been taught and demonstrate what they have learned. By showing the

instructor how to use this new knowledge the learners also show themselves that they have successfully learned the new material to which they have been exposed.

Indications of whether or not the audience understands the concepts and principles that have been discussed can often be ascertained by nonverbal clues such as smiles or nods of approval.

Asking learners to show where they would trim a particular branch that has not been referred to during the demonstration is an example of eliciting performance. Also, asking questions that refer back to earlier terms will confirm that they do indeed understand the material. This type of interaction between the instructor and learner often occurs throughout the entire discussion.

Provide feedback. Either positive or negative feedback from the instructor to the learner is essential if the learner is to understand whether or not the information they have internalized is correct, and to what degree. Such feedback need not be overt or obvious but rather might be a few simple words of support or praise (Smaldino, in press).

Often if the learners are asked, for example, to point out the location where a proper pruning cut should be made, they become quite self-conscious. A word of encouragement, a gentle correction or a positive reinforcement will help internalize the procedure.

Assess performance. Performance results will indicate whether or not the intended messages are being internalized by the learners and suggest the relative success of the exhibit. If most learners appear to understand the principles and are able to show their knowledge of the techniques in a variety of examples, then the instruction would be considered successful.

Long term observations in the field will indicate to the instructor whether appropriate practices are being employed by the learners (Smaldino, in press). Future interactions with the learners and observations throughout the community will serve to reveal the extent of their grasp of the subject of tree care.

Enhance retention and transfer. Providing a variety of different opportunities to view the different principles of proper tree care on the exhibit tree will enhance the retention of these concepts. The more examples that are shown in various differing

situations, the better the learner will be able to transfer the newly acquired knowledge to novel situations (Smaldino, in press). Ultimately these same principles can be applied to different tree species.

A discussion of the generic quality of sound tree care ideals will allow the learners solve similar, though not quite identical, problems that they might face on their own trees. Also, the availability of printed materials that the learner may keep will allow for the review of appropriate principles as needed by the learners (Kemp & Dayton, 1985).

Learning Capabilities

Each of these events of instruction can be applied to five different types of learning capabilities (Gagne & Briggs, 1979). With the exception of gaining attention, the instructional approach will vary for each event depending upon which type of learning capability is being considered. When teaching proper tree care all of the learning capabilities will likely be addressed although, as indicated above, not all events will be necessarily be initiated by the instructor.

1. Intellectual skill.
2. Cognitive strategy.

3. Information.

4. Attitude.

5. Motor skill

Intellectual skill. The conceptualization of the principles of tree care illustrates a manifestation of intellectual skill. The learners' ability to apply these principles to novel situations is evidence of the acquisition of this skill. If the learner can apply the principles of proper pruning to a randomly selected branch then intellectual skills are being demonstrated.

Cognitive strategy. The abilities of learners to develop original (or at least non-instructed) solutions to tree care problems based upon known tree care principles represents an example of a cognitive strategy. True internalization of these principles is indicated by cognitive strategy. Learners would be exhibiting cognitive strategy if they were able to properly prune a shrub after receiving tree pruning instruction.

Information. Definition of terms and listing the proper sequence for various tree care procedures are simple examples of learners storing and retrieving information. Remembering such information provides the

basis for further, more complicated learning. Information, then, as it is acquired, becomes a basic, body of knowledge. Sequencing the steps required to remove the weight from a tree branch or listing the parts of a tree would be examples of information capabilities.

Attitude. As learners develop positive or negative feelings they begin to develop attitudes (Fleming & Levie, 1978). Attitudes serve to direct the learners' responses to a need for action under a variety of circumstances. Personal choice becomes a large factor in dictating which actions will be taken. Cultivating a respect for trees as an integral part of the urban environment would constitute an attitude.

Motor skill. Direct observation and hands on practice are accepted methods of developing motor skills appropriate for tree care. Exhibiting proper pruning techniques provides perhaps the best example of motor skills in the field of arboriculture.

Innovation-Decision Process

After learners have been exposed to all of the new information at the "What's Wrong With This Tree Exhibit", the next logical step is to encourage them to

use these new concepts. This encouragement actually begins during the instruction process and will continue after the learning has ended.

As the learners consider and subsequently adapt or reject the new tree care techniques they are involved in a procedure known as the innovation-decision process (Rogers, 1983). This process can be visualized by a model illustrating five stages that learners pass through as they consider new concepts and principles:

1. Knowledge.
2. Persuasion.
3. Decision.
4. Implementation.
5. Confirmation.

Learners tend to follow these stages as they evaluate new ideas and decide whether or not to accept them. This process takes time and generally follows the above order although a reversal of the persuasion and decision phases may occasionally occur.

Knowledge. In order for the learners to accept new tree care ideas they first must be exposed to them. If the learners feel a need for new information they will

sometimes actively seek out innovations but many will wait for the news to filter down to them.

A general public awareness of the need for proper tree care will create a need for more information by more people and thus facilitate the innovation-decision process. Many people are not aware that there is a problem with today's urban forest or their personal trees and therefore have not yet realized the need for improved tree care.

There are three types of knowledge that the learners are exposed to that will help them gain a perspective of what proper tree care is all about. Each type is based on the one that precedes it:

1. Awareness knowledge.
2. How-to knowledge.
3. Principles knowledge.

After the learner is aware that new knowledge exists the next step would be an explanation of how to convert this knowledge into action. This would be followed by an understanding of the principles that underlie the procedures. It is entirely possible to embrace the new tree care techniques without understanding the principles behind them, but chances

of improving tree quality are greatly enhanced when these principles are thoroughly understood.

Persuasion. Once the learners are aware of the concepts of proper tree care they then must decide whether they favor or oppose the new information. Their attitudes will be greatly influenced by three behaviors often exhibited in the innovation-decision process:

1. Where information is sought.
2. What messages are received.
3. How the information received is interpreted.

Professional arborists can use the persuasion stage to positively influence the learners attitude toward the proper care of trees (Fleming & Levie, 1978).

Fundamentally sound information, readily available and in easily understood formats will help the learners form a positive attitude. The "What's Wrong With This Tree" exhibit provides an opportunity to dispense this information to a large number of interested people.

Decision. After the learners form an attitude they then make a decision. A decision to either accept the new information and techniques or reject them.

Most learners prefer to experiment with innovations or observe the results of other people's trials of innovations before deciding for themselves (Fleming & Levie, 1978). This creates a difficult problem when dealing with trees, however, since the results of such experimentation are not usually immediately known.

The learners, then, must rely on the expert testimony of the professional arborist for credible tree care advice. Without such advice and in the absence of easily observable trials, the learner is apt to reject the new techniques as accept them. Such rejection may be a conscious decision or merely a failure to follow through with the acquired knowledge.

Implementation. It is not enough for the learners to decide to except the concepts and techniques of the new methods of tree care. They must also implement these techniques and actually provide appropriate care to urban trees.

Turning a favorable decision into action often requires easy access to answers to the common problems that the learner is likely to encounter in the field. Brochures with descriptions and diagrams can provide

this type of technical assistance for the learner (Heinich, Molenda & Russell, 1985). The "What's Wrong With This Tree" exhibit provides a handy outlet for the distribution of such literature.

Confirmation. Finally, the learners must either convince themselves that they have made the correct decision or decide that they made a mistake and undertake alternate methods of tree care or neglect. Continued educational programs and exposure of the learners to supporting information from other sources will help reinforce the learners decision to embrace the innovations (Fleming & Levie, 1978).

Likewise, if contradictory evidence comes to light in the scientific community, then arborists have a similar obligation to inform the learners. The duty of the professional arborist as an instructor is ongoing and must accurately reflect the current status and results of research.

Combining the Events of Instruction and the Innovation - Decision Process

An examination of Gagne's events of instruction reveals that events four through nine essentially deal with the dissemination of knowledge. Likewise, in a

broad sense, the five types of learning capabilities are also related to an assumed base of knowledge.

Knowledge, of course, is the first stage in Roger's innovation-decision process and, as such, provides a link to the theory of the events of instruction.

Further strengthening of this link can be found in the relationships between the types of knowledge and the types of learning capabilities:

1. Awareness knowledge implies information learning capabilities.

2. How-to knowledge relates to cognitive strategy learning as well as motor skill learning.

3. Principles knowledge requires intellectual skills learning capabilities and contributes to attitude learning.

Additional correlation can be seen between the four stages of the innovation decision process that occur after the knowledge stage and the types of learning capabilities:

1. The persuasion stage is directly influenced by attitude learning capability (Fleming & Levie, 1978).

2. The decision stage also appears to be affected by attitude learning capability.

3. The implementation stage seems to relate directly to both motor skill and intellectual skill learning capabilities.

4. Confirmation of the decision to accept the innovation would be a result of cognitive strategy learning capability.

Given the apparent correlation between Gagne's events of instruction and Roger's stages of the innovation-decision process, the arborist is now in a position to maximize the potential of the "What's Wrong With This Tree" exhibit. With an understanding of the elements of proper tree care as well as the principles underlying both theories, the instructor can more effectively and efficiently teach proper tree care to the general public.

The events of instruction provide for the capture of the learner's attention and the subsequent transmittal of a body of potentially useful knowledge. As this knowledge is being disseminated, the instructor can utilize the stages of the innovation-decision process and begin to encourage the learner to accept the innovations in tree care that are supported by current research.

Evaluation

Learner Evaluation

There will be four general types of learner evaluation that will be employed on this project:

1. Observation of the learners during and after their interaction with the exhibit. Learner interest and involvement will indicate some measure of their internalization of the materials that are presented.

2. Learner response cards, offering a chance to win a free tree to those who take the time to answer a few questions will provide feedback indicating the relative success of the exhibit.

3. Requests for additional information, either available on the site or by later mail, will provide a measure of the interest activated by the exhibit.

4. References to professional usage of the exhibit and the materials presented will be sought through professional journals and personal contact.

Formative Evaluation

The exhibit will initially be shown to a small group of colleagues. Then, a small group representing the target population will attend a critical presentation of the exhibit. Next, the exhibit will be

presented to a representative school class and in a lightly traveled public area. Finally, the exhibit will be made available to the local school systems and will be presented at major city-wide events and high traffic locations throughout the metropolitan area.

After each presentation evaluation surveys will be distributed carefully studied and the results incorporated into subsequent exhibit revisions. Audience questions will be recorded and studied for indications of confusion, comprehension, interest and motivation.

Summative Evaluation

After the exhibit has been through the formative evaluation process, extensively utilized and refined as needed, a summative evaluation will be developed including the following:

1. Discussion of the merits of the exhibit and any similar exhibits that are developed.
2. Generalization of the overall achievements of the exhibit.
3. Reference to the uses of the exhibit and types of locations in which it was used.

4. Listing of requests for further information that are directly attributable to impetus or information provided by the exhibit.

5. Identification and description of the learners that utilize the exhibit.

6. Description of any survey techniques that are implemented.

7. Analysis of costs and benefits of the exhibit.

8. Documentation of the instructional process.

9. Examples of how this presentation might be used in the future.

10. Description of the formative evaluation and subsequent revision process.

Conclusion

The "What's Wrong With This Tree" tree offers a number of opportunities. Opportunities for arborists to interact with the public, to effectively teach the proper methods of tree care, and to expose the public to innovations in arboriculture. By integrating this exhibit with the principles of instruction and communication, the arborist is in a position to improve the quality of the urban forest as well as spread the wisdom of sound tree care practices.

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