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Date 8/6/81

CLASSROOM METHODS FOR METALSMITHING

AT THE SECONDARY LEVEL

by

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ABSTRACT

In this paper, the author has attempted to introduce some broad educational concepts that might be of interest to the teacher, attempting to keep comments "teaching-methods" oriented. In doing this, the author has attempted to point out the need for research in the area of metalsmithing at the secondary level, as well as point out different classroom characteristics, including the variety of students in secondary art classes. The author has touched on some adolescent needs that should be of concern to the secondary teacher in metalsmithing, and has suggested the problem-solving approach as a method of dealing with those needs. Lesson presentation is discussed, briefly covering some design aspects, lecture, demonstration, materials, and class assignments. This paper is meant to be an awareness guide; something that a teacher can refer to or use as a skeleton frame of reference or as a basis for further teaching-methods research to aid in the development of his educational philosophy.

INTRODUCTION

There is a need for research in art education, specifically in the area of metalsmithing. This has been substantiated by a number of facts, and by several authorities. For instance, some student teachers, though technically adept, are lacking in the basic educational skills involved in the presentation of a lesson in metalsmithing. Michael Steveni, in his book Art and Education states, "One of the great difficulties that I have encountered in the training of teachers is the fact that many of them know what they want to do, but they are not very sure of how they are best equipped to set about doing it." (1) There seems to be almost unlimited technical information dealing with the metalsmithing process, but nothing dealing with teaching methods in the secondary classroom. Additional testimony to this fact is the result of a computer search conducted in July 1981, through the services of the Montana State University library, through the Online Bibliographic Service program. This program is designed to streamline the search for theses information, through a company in Palo Alto, California. Using the key words education, secondary, art, and jewelry or metalsmithing, on two different data-bases, education and art education, it was discovered that there has been no major research done specifically in methods of teaching metalsmithing on the secondary level.

This paper is being written in partial response to this apparent need. The author's main objective in writing this paper is to try to

eliminate some of the uncertainty and trauma involved in launching a metalsmithing class by offering some broad educational concepts, substantiated by various authorities, which the teacher may use as a reference.

Methods and Curriculum

At this point, it is important to define the author's interpretation of methods and curriculum. The author's interpretation is based on the Billings, School District #2 Art Curriculum Guide, completed in 1974. It lists the program content for every art class offering in the school system, suggesting required course content as well as possible supplementary offerings. It makes no reference to how to teach any of the suggested units in the classes, only what to teach to maintain the district curriculum continuity (2). This is the basis for interpretation used in this paper. Curriculum is directed to what to teach, whereas method refers to how to teach, though there may be some gray or overlapping areas between the two concepts. The author has tried to maintain this concept throughout this paper by purposely avoiding suggestions of what to teach in a secondary metalsmithing class. There are too many variables, like class size, class load, equipment availability, supplies availability, budget limitations, administrative attitudes, personal knowledge, etc., effecting the organization of the class to cover in a paper of this type. Instead, the author has tried to

cover a few broad-based concepts in art education that a teacher might use as a source of reference itself, or as a basis for further research in art education. The one deviation from not recommending what to teach is the section on design, where the author suggests that a design unit be taught some time during the metalsmithing course. In doing this, however, the author has tried to maintain a broad enough approach to allow for interpretation and adaption for the individual teacher. Any reference to process procedures is meant to be seen as an example, and not as suggested course content.

Metalsmithing is an art form that has a combination of characteristics that makes it an appropriate secondary art medium. Its technical aspects require a great deal of close scrutiny and concentration, thus exercising the adolescent's mental and fine-tuned physical attributes. It also increases the student's powers of observation and foresight as the planning and engineering of a piece require that he anticipate both the final form as well as potential problems encountered during the creation of that form.

The Classroom

In the secondary classroom, the teacher may expect a variety of students. In contrast to a college atmosphere where classes are largely composed of students with a common interest, the teacher should prepare himself to adjust to a secondary situation where classes

may be composed of students with a wide assortment of characteristics, i.e., motivation, intelligence level, maturity level, artistic experience, and grade level. Italo L. de Francesco explains in his book Art Education: Its Means and Ends that this is a common phenomenon in many structured secondary schools. He says that the heterogeneous nature of the typical art class is due to the convenience factor, that is, whenever a vacant space appears on a predetermined class schedule, the student is frequently put in art (3). Whatever the case, the teacher must adapt himself to the situation by creating assignments that will be meaningful to the entire cross section of individuals. De Francesco again comments:

> Herein lies a major difficulty as well as a great challenge: How to do an adequate piece of work for all amid the limitations of the typical educational system, and still be mindful of those individuals whose creative potential is high (4).

This is a difficult situation to which the teacher must adapt. He may be aided by some knowledge of the factors affecting the student/teacher relationship. Among those factors that might aid the teacher is an awareness of the common characteristics or needs of adolescents. Many books dealing with secondary art education contain a section devoted to this subject. De Francesco discusses in detail what he considers to be the crucial points to be considered in the establishment of pupil/teacher rapport. They are:

> (1) the need for guidance, (2) the need for proper stimulation, (3) the need for producing satisfying products, (4) the need for

> personal harmonization with the group, (5) the need for significant activity, and (6) the need for social integration (5).

Specifically, metalsmithing would satisfy the need for guidance by providing numerous situations where the teacher would have the opportunity to lead students toward intelligent decisions regarding problems. For instance, if the student wanted to know which was the most suitable metal for making a belt buckle, the teacher might show that student an annealed piece of several different types of metals available to the class, and let him make his own decision, based on the properties of these samples. Stimulation can be provided in a number of different ways in metalsmithing, i.e., by showing slides or actual examples of projects created by the method being taught, by suggestions of projects or designs that reflect the student's interests, and by first-hand demonstrations of the method being taught. Basically, anything that would arouse the student's desire to begin work or continue a process could be used. The need for producing satisfying products can be met in metalsmithing by virtue of its broad spectrum of processes. Many of these processes have a wide range of difficulty. Consequently, basic projects can be produced relatively quickly. Cast or fabricated rings, and pierced pendants are examples of basic projects that can range from simple to complex in nature. The need for personal harmonization with the group can be satisfied through the organization of a group project, such as the design and fabrication of a metal composition, where each student in the class is assigned a particular segment of the project

that he is responsible for. During the final assembling of the project, the importance of the individual pieces to the whole project would help give each student a feeling of self-worth as his piece contributes to the final form. In metalsmithing, any activity which would direct the student's energy toward the assignment objective would be considered significant activity. Some of these activities would be designing a project, working on any phase of a project, discussing problems and their possible alternatives, experimenting with materials, etc. Significant activities then, would depend on the objectives of the teacher. Social integration can be achieved because the processes in metalsmithing are not discriminatory, that is, they do not require a great deal of strength, nor a specific economic or racial background, nor a specific sex to be successfully accomplished. The processes require the same from everyone, and unite the students by virtue of a shared common experience.

Steveni lists the factors in the classroom that affect the point of view of both the teachers and the pupils. These factors from the teacher's point of view are:

1. teacher's technical ability,
2. his personality,
3. the opportunity presented by the environment (space and materials),
4. how he handles certain situations, based on past experience, and
5. his degree of training and self-concept of success and how to achieve it.

From the pupil's point of view, the factors are:

1. his own ability,
2. his personality,
3. his group conformity,
4. his work environment and opportunity to work, and
5. his ability to understand instructions.

As can be seen, some of these factors are similar, but Steveni places them at different ends of a scale. He claims that the teacher's success in the classroom will largely depend on his ability to achieve a combination or balance of the different factors involved. He lists these things because he feels that the more the teacher knows about his own abilities and limitations and those of his students, the better he will be able to select the type of activities he wishes the students to undertake (6). If the metalsmithing teacher tends to be rather tightly structured and rigid, and the students generally lean toward the free spirited attitude, a compromise must be achieved somewhere between the two extremities to achieve a workable classroom situation. It is unrealistic to expect the teacher to become as relaxed as the students, or for the students to become as rigid as the teacher, and still maintain a classroom atmosphere conducive to creativity and high morale. The beginning teacher would be wise to refer to authorities like Steveni to seek insight into the cause of different classroom complications. Again, discovering the cause of a problem would probably greatly aid in its remedy.

Earl W. and Marlene M. Linderman, in Crafts for the Classroom, list

a set of teacher strategies they believe would be of benefit to a teacher in his efforts to improve teaching conditions. Some of them are:

1. Be an inspiring, positive . . . person.
2. Be informed on content and . . . skills and demonstrate these with confidence and proficiency; be the artist model for the student.
3. Establish specific long-term and short-term objectives within the . . . curriculum that can be attained by every child.
4. Establish objectives with the students, arriving at them through dialogue and written statements, and sharing viewpoints and interests wherever possible.
5. Encourage conditions that stress questioning, good listening, interchange of ideas, and dialogues that are relevant to student interests and levels. Lead the student to the point where he makes his own discoveries.
6. Establish discipline measures with the students, so that each student realizes what is expected of him.
7. Function as a guide, resource person, idea-generator, and counselor.
8. Have a broad knowledge of the related arts so that an arts and art-related vocabulary can be taught.
9. Exhibit each student's products at varying times.
10. Provide open-ended situations where a student can respond with his knowledge and skills. (7)

The metalsmithing teacher can improve classroom conditions by being an inspiring, positive person because it is more pleasant and enjoyable to work in a classroom free of tension and negative feelings. The teacher being an artist model could instill student confidence in him by participating in activities as a professional artist and demonstrating the techniques involved to assure the students that he has an active involvement in metalsmithing. Establishing specific long-term and short-term objectives that can be obtained by every student can be accomplished in metalsmithing through its wide range of technical processes. If the long-term objective was to teach the process of marriage of

metals, the students would first have to learn the short-term objectives of piercing, filing (fitting), silver soldering, and finishing. This is typical of many processes in metalsmithing, where a single process may actually be comprised of several subprocesses. Establishing discipline measures with students, as was previously mentioned, is important so that each student realizes what is expected of him. The instructor must quickly establish and consistently maintain class control from the standpoint of safety and continuity. He must require an attentive atmosphere when he is demonstrating or lecturing, because if he doesn't do this, he gives the impression that what he is saying or doing is not important. The consequences may be minor, such as a ruined project, but they could also be quite serious, resulting in the injury of a student. Having a broad knowledge of the related arts will enable the instructor to relate metalsmithing to other areas by showing similarities and differences in trends, design, and aesthetic values, thus enhancing metalsmithing by equating it with other fine art forms. Exhibiting students' projects at various times can serve many purposes. Students can learn through directly comparing their design concepts and project interpretations to others. Students' self-concept and ego can be increased through the positive reactions of other students to their projects, thus instilling confidence and motivation. The remaining teacher strategies including interchange of ideas, use of student interest in project creation, solution discovery, the teacher as guide

and resource person, and providing open-ended situations have all been discussed in greater detail in the chapter entitled "The Lesson". These are a few considerations that would encourage a positive classroom atmosphere. Many of these steps are consistent with the author's viewpoint, and will be referred to occasionally as collaboration.

Problem Finding and Solving

The execution of a metalsmithing project from conception to completion involves a problem solving process that is as inlimited in learning potential as there are different processes in the metalsmithing area. Every different process in this area is individually comprised of subprocesses that provide their own set of problems to be discovered and overcome. The problem solving process is generally recognized by authorities as an excellent tool in creative development and learning. Problem solving, as defined by John Dewey, involves the discovery of the problem and a sequence of steps that eventually lead to a conclusion. These steps are:

1. a difficulty is noticed,
2. its location and definition,
3. suggestion of possible solutions,
4. development by reasoning of the meanings of the suggestion, and
5. further observation and experiment leading to acceptance or rejection (conclusion). Belief or disbelief (8).

Harold Rugg also comments on this process, but differs from Dewey slightly, saying that there are only two definite stages involved in

problem solving. They are:

1. the perception of the problem, coupled with the flash of intuition and also with possibilities for solving it and
2. the logical process of verification of the chosen solution (9).

An example of how this might work in metalsmithing would occur in the process of silver soldering, if a student notices that his metal joint is not soldering together, but the solder is flowing off to one side. He reviews his notes and discusses his problem with his teacher and discovers that he is heating the metal unevenly, not fluxing the joint properly, or not placing the solder so that it is overlapping the joint. He repeats the preparatory steps to soldering, and discovers that he can either tease the solder into the joint with a solder pick or direct more heat to the opposite side of the joint from which it originally flowed, and draw the solder back into the joint with that heat. The solder flow-along the joint is verification that he has followed the correct procedure, consequently solving his problem.

The painter Yasuo Kuniyoshi implies that problem solving creates a progression of learning experiences when he states,

> There are numerous problems that beset the artist in his work. Consciously or unconsciously each artist tries to solve them . . . Once accomplished to my satisfaction, however, it becomes an integral part of me, enabling me to go on to another problem (10).

Metalsmithing is very much like this in the fact that by its very nature, it involves the observance, exploration, and trial of mini-processes within other processes. It involves progressions or sequences of learn-

ing that evolve into a metalsmithing technique. Frequently, it is impossible to continue in a particular process until a preliminary portion of that process is successfully learned. In silver soldering, the student will discover that silver soldering is very difficult until the joint to be soldered is fitted very closely together. In order to accomplish this, the student may have to learn to properly bend, form, file, and sand the metal; mini-processes that each have their own peculiarities to be learned before it is feasible to go on to silver soldering itself.

Edward L. Mattil, in his book Meaning in Crafts, verifies this fact when he comments that "crafts provide opportunities for problem solving if the assignments are open ended and provide the condition for the child to discover things for himself. If the project meets these conditions, it will quickly 'take over' and be completed in its own way" (11). This implies that the problem solving approach not only promotes learning, but also contributes to the project's individuality. Whatever theory or combination of theories the teacher chooses to incorporate into his program, it is generally agreed that the problem-solving approach lends itself to the most progressive learning situation.

The success of a project partially depends on how well the teacher is able to relate the problem-solving process to the students through his assignments. As was stated previously, the project proposal should be somewhat open ended, with as few absolute limitations as possible. The project parameters should be flexible enough to allow individual

interpretation in its completed form. This is not to say that students should be given unlimited freedom in the interpretation of the assignment. For the sake of class consistency, they might have a set of minimal criteria for their reference. A project with too many exacting limitations may have a stifling effect on the student's enthusiasm and creative potentials. For example, a silver soldering assignment may be given with the only limitation being that a minimum of five soldered joints be in the piece. Projects might be taken from a list provided by the teacher or from other students in the class. Whatever the assignment, the instructor should keep in mind that "the main purpose of the teacher is to act as a catalyst to bring about growth in creativity" (12). This can be accomplished through the problem-solving approach.

Design

The creative process in metalsmithing at this level is aided by a knowledge of the basic principles and elements of design and their application to given situations. In the spirit of perpetuating the total education of his class, it would seem appropriate for the teacher to promote some awareness of design. Of the art education books available, whether they deal with curriculum development or instruction in a specialized area, many of them devote a section to design, with the general attitude that even a basic knowledge of design will greatly aid the student. Even a general understanding gives the student a starting

point and a frame of reference for dealing with the problem-solving situation. Ralph L. Wickiser, in An Introduction to Art Education, points out that even in "designing a simple object . . . he (the student) must consider such problems as the material used, its color and finish, its decoration, its function, its size, and its shape" (13). This implies some of the mental processes involved in the planning of a metalsmithing project. The use of the principles and elements of design necessitate a certain amount of imagination, intuitive application, and originality, for without adherence to these principles, projects may have a tendency to appear disorganized and unaesthetic. The results may be poor and unrewarding to the students, causing discouragement and loss of motivation.

It would be unfeasible for a teacher to set his instructional goals too high in the area of design. He probably should not try to teach every possible aspect of design to a class of this age level. First, time would probably not permit it. Second, the mentality of the typically heterogeneous class at the secondary level would probably only accept and comprehend a fractional amount of this information. Third, it would be presumptuous for a teacher to think that he knows everything about design, much less have the ability to teach it. Steveni backs up this statement by saying,

> It is unrealistic for a teacher to expect to be able to teach a class at this (secondary) level, or expect a class at this level to fully understand the implications of design. The job

of the teacher in the secondary school is to promote awareness that can be built upon in different ways" (14).

A more realistic approach might be for the teacher to attempt to teach his class the basic design fundamentals and their different applications singly, rather than as a whole. The instructor may wish to isolate some aspect of design especially applicable to the current assignment, and explore it thoroughly. This practice of isolating one particular design element might be a good method for maintaining the design thought process, by repeating it at different times throughout the school year. For instance, if the design element being discussed was line, the teacher might show examples of some different ways that line could be used in metalsmithing. Projects showing a strong edge, or dominant use of wire, as well as engraving and etching would all be appropriate to this particular unit. Some discussion of the effectiveness of each of these types of line should accompany the examples.

Mattil, in Meaning in Crafts, gives three main sources of design: nature, material, and function. Nature acts as a point of departure and as a source of inspiration, using forms, textures, and rhythms. Though these might be interpreted directly in drawing or painting, they will tend to become symbolic or abstract in crafts design. Some materials may impose their own design limitations by their very nature. Wood cannot be stretched, melted or oxidized, and by its nature suggests to the designer what may be done with it. Function may also, to some degree, dictate the shape of a design (15). For the same reason a chair

must have legs to stand on, a bracelet must somehow attach to the wrist.

Patricia Meyerowitz comments on the functional aspects of design in her book, Jewelry and Sculpture Through Unit Construction, saying that ". . . function can determine much about design, but it should not be too much of a limitation as the piece may be as rewarding to look at as it is to wear" (16). This concept adds an additional source for design than the three previously mentioned by Mattil, as Meyerowitz alludes to the contemporary sculptural feeling that much metalsmithing currently has. A category of jewelry, like the neckpiece, ring, bracelet, fibula, etc., may simply be an inspiration for the creation of a sculpturally oriented piece. Though the roots of the idea may have come from functional ware, contemporary thought has largely dissolved the concept that all metalsmithing must be utilitarian. Another example of this concept is the elaborate mechanisms that are currently being created to store and display jewelry when it is not being worn. The fact that these mechanisms go far beyond the simple jewelry box or ring stand is indicative of current design thought. A third example is metalsmithing as sculpture. This is a category where pieces are created totally for the purpose of eliciting emotional responses from the viewers. Solberg, in the introduction to her book Inventive Jewelry Making, reinforces these comments by saying,

> Today, the word jewelry no longer evokes the same mental images as it did in the past. Visions of precious metals and intricately set faceted stones have been replaced by innovative,

> sculptural objects as attractive adorning the body as not. Its expression ranges from fanciful to witty, intellectual to primitive (17).

This particular type of emotional approach to design could be taught as an alternative to the more structured nature of the principles and elements of design. As a minimum, however, the teacher should make his classes aware of this trend through discussion and examples.

A plausible method for teaching design might be to combine any good design resource, like a basic book or film, with any good metalsmithing resource, like a basic book, slides, film, or museum display. As a particular concept of design is discussed, it could be immediately related to metalsmithing through one or more of the other resources. On the other hand, as a particular piece of jewelry was being viewed, the teacher might discuss its design aspects through lessons learned in the design book or film. The important part is to discuss the two in conjunction with each other rather than treating one independently of the other. This would be a good opportunity to employ the attitude development lesson discussed in the next chapter entitled "The Lesson". Instead of assigning a piece of jewelry emphasizing contrast, the teacher might ask how contrast could be used in metalsmithing projects, and formulate an assignment based on the pupil responses.

It might also be appropriate for the teacher to point out to his class that the design process does not have to follow a static, rigid application of rules and premises. It can be a flexible process, con-

stantly changing, and only reaching its finality with the successful completion of the project. It would be advantageous to keep in mind a quote from Mattil:

> . . . the crafts teacher should keep in mind that no source of design exceeds the imaginative ability of the designer. No rules of design can extract anything exciting if the imagination of the child has not been aroused (18).

The Lesson

Of the many theories on the approaches to the art lesson, Steveni's seems to be especially suitable for metalsmithing at the secondary level. He presents a theory that has two main approaches to the art lesson, each with its own particular strengths. The first is the information based lesson, within which precedence is given, first and foremost, to the acquisition of facts by the pupil: the development of skills would come second, and attitudes concerning these facts and skills, third. The second theory is the attitude development lesson within which attitudes are the most important element; attitudes about ideas, facts and skills in varying proportions as they are needed. This particular theory allows the student to expand concepts on his own by developing creative attitudes relating to facts and processes. Steveni also states that within every art lesson, there are elements of each of these approaches (19).

This particular approach, by its definition, would seem to be ideally suited for metalsmithing. The information based lesson might

be used in the initial stages of a new unit, where it is necessary to present a given amount of technical data and terminology and acquaint the class with a particular process. This could change to an attitude-development lesson as the presentation moved from the information issuing stage to the assignment portion. This is assuming that the assignment provided some sort of open-ended solution, allowing the student to expand the basic concepts on his own. For instance, in the process of marriage of metals, the information-based lesson would include the lecture/demonstration, where the technical data, procedure, and terminology are covered. The instructor could then switch to the attitude-development lesson by asking for opinions on the purpose of marriage of metals. After the responses from the class have ended, the teacher might then ask for different ideas on how this process could be employed in metalsmithing, as well as how they could use this process in creating projects that reflect aspects of their own interests.

These assignments in metalsmithing, whether original or not, have a tendency to reflect much about the instructor's personality; his likes and dislikes, his strengths and weaknesses, his adaptability or rigidity, and his conservatism or progressivism. Helen Merritt, in Guiding Free Expression in Children's Art, implies this by saying, "Classroom teachers, like other people, are subject to their own emotional paces in accepting new movements. If they do not understand or enjoy contemporary art, they cannot teach it well. . ." (20). In this

statement she intimates that a teacher cannot teach something he doesn't understand or like. Since it is natural for a person to avoid the things he doesn't like, he will probably avoid teaching that process with which he is unfamiliar or one that he dislikes, consequently reflecting much about his preferences. This is a natural phenomenon that certainly isn't restricted to the areas of art. Instead of being overly concerned about what he is saying about himself in his assignments, the instructor should be more concerned with the achievement of the final objectives of the assignment. He should not be worried about over-influencing the beginning art student.

Some instructors claim to use minimal instruction under the pretenses of retaining freshness and originality in the students' projects, or as a method of not polluting their minds by injecting too much of his own technique. This concept is largely a result of the actions of the ceramic Abstract Expressionists at the Otis Art Institute in Los Angeles, under the direction of Peter Voulkos. Collectively, Voulkos and his students adopted no single style or ideology, except the agreement to avoid having any single style or ideology. The group was purposely eclectic, drawing inspiration from as many and varied sources as possible, including painting, music, poetry, etc. The results of this unstructured, open classroom situation yielded America's only truly original fine art form since the conception of jazz music (21).

This method of instruction leaves much to interpretation. It can

be thought of as what it actually claims to be, but more often is interpreted as a lazy instructor's method of operating his classroom. The results are sometimes much less than acceptable, because many students of the high school age need direction and guidance. They need the security of having an instructor who outlines concrete guidelines in his assignments. and is available to aid them in all areas of this new and often confusing area of art. (See Teacher Strategies on Pages 7 and 8).

Some authorities have commented about the secondary student's need for security and guidance. Referring to young art students, Italo L. de Francesco says, ". . . learning and growth are stimulated by security . . ." (22). Later he gives "emotional security" received from the teacher as one of the tree basic classroom adolescent needs (23). Ralph L. Wickiser claims, ". . . most youth need supervised work experience as well as education in the skills and knowledge of their (chosen art area)" (24). He later states, ". . . as facility and mastery of materials is acquired, he will need more individual attention and instruction . . . to develop his potential ability" (25). Security can come from the nature of the assignment given to the students. Most students at this level need assignments that do not leave too many loose ends. This is distinguished from the open-ended assignment, where assignment solution is individual. Loose-ended assignments would have a tendency to be more indefinite, and the teacher may have trouble directing

the students toward the ultimate objectives. Instead of just giving an assignment in piercing, for example, it would be much better to accompany the assignment with the project limitations, like the size and gauge of metal to be used, minimum number of negative spaces, possible project categories that could be completed in a piece of metal of moderate size (3" x 3"), and the project due date.

The assignments, of course, should be pupil oriented to be more meaningful to the students. De Francesco makes some pertinent comments on the nature of the assignment stating that the project should be meaningful to the pupil, making sure that he realizes its potentialities and problems. The pupil should be allowed to have a degree of freedom of expression as a condition most conducive to maximum growth. This is not to say that children should be allowed to do what they please in the interest of freedom and imagination with no guidance or discipline. Not all art experiences are play, some are plain hard work (26). Wickiser backs up de Francesco's earlier statement by saying, "When young people are allowed to follow their personal interests . . . they will devote time and energy to the problem" (27).

These conditions can well apply to metalsmithing in high school. With a little imagination the creative teacher should be able to formulate assignments that would have some relevance to the pupils. For instance, if silver soldering was the technique to be taught, the teacher may ask the students for project ideas, and list them on the chalkboard.

This would give a good indication of the relevance of the projects, as the initial responses from the students would probably be those projects that they were most interested in.

The formulation of an assignment involves many components. Some of these components might be the demonstration with the accompanying lecture, discussion and use of different materials, and the project proposal, all of which should be organized in some logical sequence. A good demonstration might be accompanied with an appropriate lecture to enhance and explain the process as it develops. The demonstration could not only consist of a step-by-step explanation of the metalsmithing process involved, but also a list of terminology involved to help the students develop a vocabulary of metalsmithing terms and phrases, (see Teacher Strategies on Pages 7 and 8). This will increase the student's knowledge of metalsmithing, and also greatly aid the student/teacher dialogue as well, thus enhancing communication. The efficiency of the students' and instructor's thinking and speaking in the same terminology should become apparent through the duration of the class. Both questions and answers could be much more easily exchanged, and criticisms and praises could be more easily made and mutually understood. In a like manner, they might be more intelligently accepted or defended. Whichever the case, a common language with which to communicate should be beneficial. This is in part suggested by June McFee and Rogena Degge, in their book Art, Culture, and Environment, A Catalyst for

Teaching, where they say, ". . . teachers should regularly include the study of craft terms in the classroom program" (28).

The lecture itself should be well planned and precise. As a particular point is made, it could be accompanied with support statements of not only how to do a process, but the consequences of not doing that process correctly. Making the students aware of the consequences of a particular action may be much more effective than simply directing them not to do it. The instructor may first direct his students not to use fine steel wool around exposed electrical outlets, and then proceed to show them the extreme combustibility of fine steel wool when it is ignited, like from the spark of an electrical outlet. This would be a graphic demonstration, but it could apply to almost all portions of a lecture/demonstration dealing with any of the tools or equipment used in metalsmithing. This particular type of cause and effect demonstration would seem to be desirable and effective, as it establishes classroom procedures as well as prevents loss of efficiency due to undirected self-experimentation on the part of the students. From the standpoint of safety and efficiency, this would seem to be one case where the information-based lesson would be desirable over the attitude-development lesson.

Those familiar with the different processes involved in the metalsmithing area would probably have some idea of the wide variety of materials available for use. It would seem that a teacher might choose,

as part of his lesson formulation, to inform his students of some of the varieties of materials available for a particular project. This should create some excitement and enthusiasm in the class as the pupils begin to recognize creative potentials that different materials offer. Wickiser makes several pertinent statements concerning materials, stating,

> . . . in all art experience, the first effort is to explore the material so as to gain some control over it . . . (29).
>
> Their experiences with new materials will stir their interest in new uses for traditional materials . . . (30).
>
> New material has its own peculiar structural characteristics . . . . Each material has its own peculiar structural potentialities and limitations within which the artist works (31).

Concerning limitations, Steveni recommends the discovery of materials through the exploration of their limitations. He says,

> Materials are the life blood of any art activity. The key to understanding materials is through understanding their limitations. . . . How does it burn? Does it erode or change in any kind of way? How can you change it? Can you color it? Could you put a surface on it? Is one state of existence more desirable than another, given a certain set of circumstances: How does it react to tools? How permanent is it? How strong is it? How heavy is it? (32).

An example of how materials might be discovered through their limitations can be accomplished by the teacher's giving each student in class a scrap of copper and asking them to list the copper's reaction to heat, twisting, bending, filing, sanding, polishing, etc. This would be an attitude-development approach to learning about copper. Concerning the teacher's role and materials, Steveni recommends that the teacher should:

> Make as many and as much available as you possibly can . . . two ways: one is to provide everything that you can possibly think of and the other is to provide information whereby most things can be either made or obtained (33).

In Meaning in Crafts, Mattil comments that materials are one of the three main sources of design, and that the form of a project may, to some extent, be dictated by the basic nature of the material (34). The teacher might extend this concept to his class and expound on it by giving several examples of how or why a certain material is suitable or unsuitable for a given project. For example, a single layer of 22 ga. copper would probably be unsuitable for a belt buckle because it is not strong enough.

McFee and Degge warn against an overemphasis on materials and against organizing an entire course around a given medium. Their research shows a preponderance of courses based on media used and not enough on creation. They comment,

> Students are presented with a medium and then have to search for ideas that will work in that medium rather than working on the symbolic expression and design of their ideas and feelings and then finding media that fit (35).

This suggests a predominance of information-based lessons in the classroom rather than the attitude-development lessons. Concerning materials then, it is the teacher's duty to find some balancing point between emphasis on materials and emphasis on design. Perhaps a good method might be to present the two in conjunction with each other, directing the student's attention to possible materials that could be used when teach-

ing a particular principle of design, or extracting a design conclusion based on a particular type of material being discussed. For instance, when using wire in the classroom it might be pointed out or discussed how wire emphasizes the element of line when left straight and the principle of repetition when it is coiled around a dowel. Whatever the concept or combination of concepts that is used, materials should be treated as an essential element of the metalsmithing process.

Summary

Throughout the duration of this paper, the author has attempted to introduce some broad educational concepts that might be of interest to the teacher, attempting to keep comments "teaching-methods" oriented. In doing this, the author has attempted to point out the need for research in the area of metalsmithing in the secondary level, as well as pointing out different classroom characteristics, including the variety of students in secondary art classes. The author has touched on some adolescent needs that should be of concern to the secondary teacher in metalsmithing, and has suggested the problem-solving approach as a method of dealing with those needs. Lesson presentation was discussed, briefly covering design aspects, lecture, demonstration, materials, and class assignments. In doing this, a great deal of material has been covered in a small space, indicating that none of the aforementioned topics were covered in great depth. This paper was meant to be simply

an awareness guide; something that a teacher could refer to or use as a skeleton frame of reference or as a basis for further teaching-methods research to aid in the development of his educational philosophy.

FOOTNOTES

(1) Michael Steveni, Art and Education (London, England: B. T. Batsford Ltd, 1968), p. 155.

(2) School District #2, Art Curriculum Guide (Billings, Montana).

(3) Italo L. De Francesco, Art Education: Its Means and Ends (New York: Harper and Brothers, 1958), pp. 364-365.

(4) Ibid., p. 34.

(5) Ibid., p. 308.

(6) Steveni, op. cit., p. 161.

(7) Earl W. Linderman and Marlene M. Linderman, Crafts for the Classroom (New York: Macmillan Publishing Co., Inc., 1977), pp. 17-18.

(8) Steveni, op. cit., p. 91.

(9) Ibid., pp. 91-92.

(10) Elliot W. Wisner, and David W. Ecker, Readings in Art Education (Waltham, Massachusetts: Blaisdell Publishing Company, 1966), p. 60.

(11) Edward L. Mattil, Meaning in Crafts (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., Third Edition, 1971), p. 12.

(12) Helen Merritt, Guiding Free Expression in Children's Art (New York: Holt, Rinehard and Winston, 1964), p. 25.

(13) Ralph L. Wickiser, An Introduction to Art Education (Yonkers-on-Hudson, New York: World Book Company, 1957), p. 320.

(14) Steveni, op. cit., p. 186.

(15) Mattil, op. cit., p. 18 and p. 20.

(16) Patricia Meyerowitz, Jewelry and Sculpture Through Unit Construction (London, England: Reinhold Publishing Corporation), p. 6.

(17) Ramona Solberg, Inventive Jewelry-Making (New York: Van Nostrand Reinhold Company, 1972), p. 7.

(18) Mattil, op. cit., p. 20.

(19) Steveni, op. cit., p. 159.

(20) Merritt, op. cit., p. 28.

(21) Garth Clark and Margie Hughto, A Century of Ceramics in the United States, 1878-1978 (New York: E. P. Dutton, 1979), p. 154.

(22) De Francesco, op. cit., p. 30.

(23) Ibid., p. 359.

(24) Wickiser, op. cit., p. 200.

(25) Ibid., p. 303.

(26) De Francesco, op. cit.

(27) Wickiser, op. cit., p. 137.

(28) June King McFee and Rogena M. Degge, Art, Culture, and Environment A Catalyst for Teaching (Belmont, California: Wadsworth Publishing Company, Inc., 1977) p. 9.

(29) Wickiser, op. cit., p. 197.

(30) Ibid., p. 329.

(31) Ibid., p. 138.

(32) Steveni, op. cit., p. 301.

(33) Ibid., p. 233.

(34) Mattil, op. cit., pp. 18-19.

(35) McFee, op. cit., p. 166.

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3. Elliot W. Eisner and David W. Ecker, Readings in Art Education, Waltham, Massachusetts, Blaisdell Publishing Company, 1966.

4. Earl W. Linderman and Marlene M. Linderman, Crafts for the Classroom, New York, Macmillan Publishing Co., Inc., 1977.

5. Edward L. Mattil, Meaning in Crafts, Englewood Cliffs, New Jersey, Prentice-Hall, Inc., Third Edition, 1971.

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