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Health and safety practices in three art classrooms

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Health and safety practices in three art classrooms

Abstract

Each day art teachers and their students use clay, glazes, paints, solvents, aerosols, and adhesives that may be slowly poisoning their bodies. In most cases there are safe art material substitutes or alternative working methods which may be used. Unfortunately, many art teachers and their students still may not be fully aware of the dangers posed by a variety of hazardous materials and processes.

The purpose of this study was to investigate the nature of teacher concern about health and safety in the classroom.

HEALTH AND SAFETY PRACTICES
IN THREE ART CLASSROOMS

A Research Paper
Submitted
In partial Fulfillment
of the Requirements for the Degree of
Master of Arts in Education

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CHAPTER I

Each day art teachers and their students use clay, glazes, paints, solvents, aerosols, and adhesives that may be slowly poisoning their bodies. In most cases there are safe art material substitutes or alternative working methods which may be used. Unfortunately, many art teachers and their students still may not be fully aware of the dangers posed by a variety of hazardous materials and processes. Art educators need to be more fully informed about health and safety in the art classroom. In fact, all teachers can become actively involved with and profit from lessons in classroom health and safety. Art teachers have a particular responsibility to teach health and safety within the art curriculum.

Purpose

Due to our growing knowledge about hazardous chemicals in schools and in the environment in general, art teachers must make conscientious decisions about the relative toxicity of the products they purchase for the studio. But what is the level of concern regarding other aspects of health and safety in the art program? Beyond acknowledging a health warning or safety label on a product, are the teachers aware of the many other

potential hazards within their own classrooms? The purpose of this study was to investigate the nature of teacher concern about health and safety in the classroom. It was assumed that teacher concern would be reflected by (a) the extent of teacher education in health and safety, (b) the extent of teacher awareness of specific health and safety issues, (c) the nature of adjustments of techniques and materials used to reduce hazards in the art studio, (d) the nature of safety conditions of the classroom for which the art teacher is responsible, and (e) the amount of instruction provided to students about health and safety in the arts.

Definition of Terms

Art classroom health and safety deals with the physical well being of the teacher and students within the studio atmosphere. Studio experiences may involve working with materials and processes that require such precautions as protective clothing, good hygienic habits, proper safety equipment, and posted information concerning the risks and precautionary actions in particular art processes. For the purpose of this investigation, the following definitions for words and phrases were used:

1. Teacher concern means a level of interest sufficient to cause the teacher to take active steps to reduce the major health hazards in the art studio.
2. Health and safety refers to different aspects of hazards. Qualley (1986) stated that hazards that cause injury are safety problems, while those that result in illness are considered health related.
3. The toxicity of a chemical is the chemical's ability to cause body damage. The more toxic the chemical, the less it takes to injure a person exposed to that chemical (McCann, 1985).
4. A hazard is a material or process capable of causing damage to the body under certain conditions (Barazani, 1978).
5. An acute illness occurs within a short period after exposure to a hazardous material or process, whereas a chronic illness appears after repeated exposure over an extended period of time. Chronic illnesses occur from a buildup of a chemical in the body, or from an accumulation of damage to the body from repeated exposure to the chemical (McCann, 1985).

Limitations

The data of this study is limited to conditions that exist in three schools in northeast Iowa. Interviews with three art teachers were used to collect the data. The interviews were not considered a statistically representative sample. However, the data give insights into health and safety conditions in schools.

The interviews were not exhaustive. Somewhat different responses might have been given, had the subjects been allowed more time to consider each of the questions. For example, only one interview with each subject took place. It is conceivable that some areas of concern about health and safety were overlooked due to the diversity and individuality of each instructional facility. Not all drawers and cabinets in the classroom studio were opened, and perhaps some potentially hazardous projects done much earlier in the school year had been forgotten by the time of the interview. It is also likely that the subjects felt some apprehension during the interview.

Assumptions

In developing the interview it was assumed that the questions were pertinent and relevant to the study and the subjects' responses would provide adequate data for analysis. It was also assumed that these responses were honest and accurate, and that the art classrooms were not changed prior to the interview to convey a different standard of health and safety conditions.

CHAPTER II

Review of Literature

The risk of injury or illness in the artroom exists just as it does in any classroom environment. Although the exact degree of risk is uncertain, exposure to potentially hazardous art materials, power tools, and cutting devices can jeopardize the health and safety of art teachers and their students. This chapter considers general writing related to health and safety in art, toxic art materials, labeling of toxic materials, storage and disposal of flammables, accidents in the classroom, ventilation, high-risk persons, and art teacher liability.

General Health and Safety

There is a paucity of literature concerning health and safety in the art classroom. Prior to 1968, the health hazards common to artists in general were rarely discussed in print (Barazani, 1978). Much of the material published since 1974 has been provided by Michael McCann, a New York chemist and science writer, and by Charles Qualley, an author and researcher of art health and safety. Additional information for this study was taken from literature by Sally Hagaman, Kenneth Paul, Gail Coningsby Barazani, Tom Anderson, Lisa Orenstein, Leah Latimer, Del Stover, and Gene Mittler.

In his description of health and safety hazards in the arts, McCann (1985) has argued that:

The problem of art hazards has several aspects to it, including the presence of extremely toxic chemicals in many art materials, inadequate labeling of art materials, the lack of adequate training of students about art hazards in the schools, and improper diagnosis of illnesses caused by exposure to toxic art materials (p. 4).

Toxic Art Materials

Many art classrooms contain toxic materials that pose a significant health hazard to teachers and students alike. Exposure to these dangerous materials can cause headaches, dizziness, nausea, skin rashes, breathing problems, and allergies. More serious problems may show up later. Birth defects, chemical dependency, and malignancies, have been linked with many materials used in art (Paul, 1989).

Toxic materials can enter the body through inhalation, ingestion, and skin contact. Hagaman (1986) reported that inhalation of powders and dusts can cause acute and chronic allergic reactions and lung diseases. Aerosol spray mists, kiln gases, and vapors from solvents can injure lung tissue and enter the bloodstream through the lungs.

Ingestion occurs when a material enters the body through the mouth. Although it is unlikely that students will swallow large amounts of an art material, substances can enter their bodies when they hold their paint brushes in their mouths, bite their nails, put gum in their mouths, or eat or drink while working with art materials (Qualley, 1986).

Skin contact with toxic materials can cause burns, irritations, and allergic reactions. Many solvents can be absorbed through the skin. Open sores, cuts, and abrasions allow the toxic chemicals to enter the bloodstream and travel to other parts of the body more easily (McCann, 1979).

Concern about toxicity in art materials has led some researchers to recommend that certain products not be used in the classroom at all. Stover (1985) stated that even the most common and familiar art products like permanent felt-tip markers, chalk, and turpentine can contain hazardous ingredients. Qualley (1986) also listed turpentine and permanent markers as materials that should be avoided in the art classroom. Permanent markers contain aromatic hydrocarbons which can be highly toxic. Repeated exposure can result in liver and/or nervous system damage. Turpentine is

highly flammable and irritating to the eyes, nose, and throat. It can also cause kidney damage.

According to McCann (1985), rubber cement should not be used in the classroom. Rubber cement is a highly flammable adhesive. It contains volatile solvents such as hexane which is extremely hazardous when inhaled.

Cold water dyes, which are commonly found in the artroom, are also a health hazard. Cold water dyes work by reacting chemically with a fiber, usually cotton or linen. These fiber-reactive dyes cause symptoms such as swollen eyes, asthma, and sudden severe allergy after extended exposure (McCann, 1979).

Cold water dyes are often used in tie-dye and batik. Tie-dye is an art process where dye solutions are poured over tied fabric. Batik is a process where molten wax is applied to a fabric to form a pattern. The fabric is dyed, and then the wax is removed by ironing the fabric between layers of newspaper. In addition to the danger of using cold water dyes with these processes, batik should also be considered hazardous because wax vapors are flammable. These vapors can accidentally be ignited while heating the wax. Overheated wax also releases irritating fumes (Qualley, 1986).

Wheat paste, often called wallpaper paste, is commonly used in the art classroom as a paper adhesive. Although some brands of wheat paste are safe to use, most brands contain rat poison and toxic mercury preservatives. Wheat paste must be considered hazardous unless it is labeled non-toxic (Qualley, 1986).

Painting is a popular activity in most art classrooms, and oil paints and water-based acrylic paints rank among the most widely used painting materials. Regardless of which of these types of paint are used, some pigments, organic or inorganic compounds used as coloring agents in paint, should always be regarded as hazardous. McCann (1985) provided a list of toxic inorganic pigments that should be avoided because they are corrosive to the skin and produce allergic reactions. Some of these pigments contain lead or cadmium, both of which are extremely toxic. Further, some pigments are known or suspected carcinogens. These dangerous pigments are common in studio paint sets and are readily available to unsuspecting teachers and students alike. Consequently, Qualley (1986) has made the following argument:

. . . the use of oil paint is virtually indefensible in any public school art program. Because oil painting requires toxic

solvents and possibly toxic pigments and is nearly always done in areas with poor ventilation, it should be avoided in high school and never done in elementary or junior high school (p. 67).

While it may be safer to use acrylic paints rather than oil paints in the art classroom, teachers should not assume that all the potential health problems associated with painting have been prevented. Many acrylics contain ammonia and formaldehyde (McCann, 1985). Ammonia irritates the eyes, nose, and throat, if it is used without adequate ventilation. Formaldehyde may cause allergic reactions in people who are already sensitive to it.

One of the most dangerous art techniques is silk screen printing which requires solvent-based inks and thinners (Stover, 1985). Most of these solvents are skin irritants, and vapors from these solvents can be inhaled. Paul (1986) and McCann (1985) suggest substituting water-based silk screen for solvent-based silk screen to reduce the hazards involved in this process.

Ceramics, considered one of the oldest art forms, is an activity common to many art programs today. The hazards in the production process are considerable. Clays contain up to 40

percent silica sand. Silica particles destroy lung cells and can lead to silicosis, or "potter's rot", and cause severe scarring of the lungs (Barazani, 1978). Silica dust can be inhaled while mixing dry clay with water, grinding, sanding, or pulverizing dry clay, and sweeping clay dust during cleanup activities.

Ceramic glazes also contain free silica and toxic metals such as lead, barium, and lithium. Mittler (1986) advises teachers and students to avoid the use of lead glazes on ceramic pieces, particularly if they are intended to hold food or drink. Certain liquids can leach the lead from the glaze and affect the health of the person using the vessel. Orenstein (1989) noted that some typical glaze components such as beryllium, cadmium, chromium, nickel, and their compounds are known or suspected carcinogens.

Most clays and glazes are eventually put into a kiln and fired. Firing clay and glazes is a process which involves heating the ceramic ware to very high temperatures. During the firing process, toxic fumes and gases are produced. Carbon monoxide, sulfur dioxide, and formaldehyde can be released during the first, or "bisque" firing. Lead, cadmium, and other metals can vaporize during the second, or "glaze" firing (McCann, 1979). In addition to emitting fumes during firing, kilns also pose a safety hazard

because they are extremely hot when fired. Temperatures may range up to 2600 degrees Fahrenheit. Heat from kilns can cause severe thermal burns. Exposure to electric coils in kilns can result in electrical shock.

There are a multitude of aerosol sprays available to the studio classroom: fixatives, spray paints, varnishes, and spray adhesives. Many of these sprays contain toluene, chlorinated hydrocarbons, and petroleum distillates, each of which is harmful to humans (McCann, 1985). In addition, many of the solvents and propellants used in aerosol cans are highly flammable. Stover (1985) indicated that teachers and students should avoid the use of aerosol sprays. Qualley (1986) suggested aerosols should be used only with proper ventilation or preferably outdoors.

Labeling of Toxic Materials

Because of the numerous toxic chemicals found in children's art materials, teachers and students must be aware of the inherent hazards of using these products. The accurate labeling of art products can help.

In 1982, the Art and Craft Materials Institute (formerly Crayon, Watercolor, and Craft Institute) expanded a pre-existing safety program to include the certification of a broad spectrum

of art and craft materials. Standards for non-toxicity in children's art materials were established and health warning labels were required on art products to be authorized as safe by the Institute.

In 1984, School Arts magazine funded a nationwide survey of art hazards (Qualley & Swadener, 1985). More than 400 art teachers responded. The data from this survey provide the first information of any kind about health and safety conditions in the classroom. In the report, few surveyed teachers noticed the AP (Approved Product) or CP (Certified Product) seals of the Art and Craft Materials Institute on the products in their classrooms. These seals insure non-toxicity when they appear on art materials.

In order for the labeling of art products to be effective, teachers must be sure that solvents, paints, and other materials are always stored in the original containers with labels intact. This practice should help prevent accidental ingestion or incorrect use by the students. Baby food jars and margarine tubs may be convenient substitute containers for small amounts of leftover materials. Unfortunately they will offer no information about specific chemical content or level of toxicity, nor are they adequate for storing flammable liquids.

Teachers and other purchasing agents must become actively involved in ridding artroom shelves of hazardous products. In a 1986 study of Washington, D.C., area schools, Latimer (1986) found at least 47 hazardous art and craft supplies on the purchase lists of area school systems. Among these products were toxic glazes, lead-bearing paint, and rubber cement.

Some progress has been made in the area of safety labeling on art products. The United States Congress recently passed the Art Material Labeling Law which became effective November 19, 1990. This new law requires manufacturers of art materials to have their products evaluated for toxicity, and labeled accordingly. Determination of materials hazards is generally done by the Art and Craft Materials Institute.

Storage and Disposal of Flammables

If solvents or other flammable liquids are used in the classroom, they should be stored in a fireproof cabinet that meets the NFPA (National Fire Protection Association) fire code. The cabinet should be labeled "Flammable-Keep Fire Away." Waste solvents and solvent-soaked rags should be stored in approved disposal containers (McCann, 1985). Pouring solvents down the sink can cause serious problems in water purification systems, and solvents placed in the trash create a fire hazard as

well as a health hazard from escaping fumes (Qualley & Swadener, 1985).

There are a number of things teachers can do to make the art classroom safer. The substitution of non-toxic for toxic materials whenever possible, is obvious. Teachers can also request a Material Safety Data Sheet from the manufacturer to get toxicity information about a product. Students should be required to wash their hands after each activity and should be instructed not to put anything in their mouths while working with art materials. Qualley (1986) suggests a first aid kit containing antiseptics, bandages, and compresses should be prepared for the classroom. Finally, the telephone number for the Poison Control Center should be posted in the classroom.

Accidents in the Classroom

Power tools, paper cutters, knives, gouges, and other cutting tools pose a safety hazard in the art classroom. Teachers should not assume that students know how to use cutting tools (Qualley, 1986). Careful instruction and supervision must be given to students when they use power tools, hand saws, and other cutting devices. It is also advisable that signs be placed on or near such equipment to instruct, warn, or remind the students about the proper use of these tools.

Other precautions must be also taken when working with tools. Approved eye protection should be mandatory when carving plaster, wood, brick, or stone (Anderson, 1986). Long hair, loose jewelry, and loose sleeves or cuffs also present a potential hazard when working with power equipment. According to Qualley (1986), students may not be aware of what might happen if loose jewelry, long hair, cuffs, or sleeves get tangled in, or wrapped around power equipment. Qualley also indicated that eye protection is necessary when grinding, polishing, chipping, carving, cutting, or sanding.

Ventilation

An important cause of health problems in the art classroom is poor ventilation. In their survey of art teachers, Qualley and Swadener (1985) discovered that only 13 percent of the 406 respondents had canopy hoods over their kilns. More importantly, 42 percent of the respondents fired their kilns during school hours with only general ventilation (open doors or windows) in the classroom. Anderson (1985) suggests that fumes from kilns be properly vented by the use of fans and open windows. An exhaust fan might suffice for small kilns, but an overhead canopy hood is preferred (McCann, 1985). Barazani (1978) has insisted that a ventilating canopy hood is a

requirement. If ventilation in the classroom is not adequate, the kiln should be fired after school hours.

Airbrushes and spray guns produce mists that can be inhaled. Thus they should also be used with direct ventilation. Ventilated spray booths offer a suitable means of ventilation for spraying in the classroom. Respirators and masks should be used under extreme conditions: when local exhaust ventilation is impractical or while a regular ventilation system is out of order (McCann, 1985). Respirators and masks are used to filter out harmful vapors and dusts a person is breathing.

High-Risk Persons

Art teachers need to take special precautions with high-risk children. According to Stover (1985), these children include the visually impaired, asthmatics, or anyone with breathing difficulties. McCann (1985) listed children under twelve years of age as high-risk because they are still growing, have more rapid metabolism than adults, and as a result are more likely to absorb toxic materials into their bodies. Teachers and students who smoke should also be considered a high-risk group.

According to Barazani (1978) smoking causes damage to the body that increases the possibility of adverse effects from many

art materials and processes. Barazani considers allergic persons to be high-risk individuals within the art classroom.

Teacher Liability

In addition to their personal concern for the health and safety of their students, teachers need to recognize their legal obligations to students. According to Hagaman (1986), "Courts have ruled that failure to provide adequate health and safety instruction or provide adequate supervision leave the teacher liable for any injuries and/or illnesses that may result from classroom experiences" (p. 44).

To avoid litigation, the teacher should provide thorough instruction and careful supervision, post written rules and warnings, and formally test students in the correct use of all art materials and equipment (Qualley, 1986). Teachers should include health and safety instruction in their lesson plans and in their curriculum records. Copies of all printed instruction, tests, lesson plans, and other pertinent data should be retained by the teacher. The maintenance of health and safety records will assist the teacher in avoiding litigation, should an illness or accident in the classroom occur. Teachers now have an increased liability as a result of the more stringent labeling and safe use statutes of the Art Materials Labeling Law.

Summary

Due to the magnitude of the potential hazards in the artroom, art teachers need to be educated in studio health and safety in order to become more mindful of the risks associated with art education. According to Hagaman (1986), "Art educators must become more aware of the potential health risks involved in many art processes" (p. 46). Qualley and Swadener (1985) suggest that this may not, as yet, be happening:

Education in and information about art hazards has been sparse; while mention of hazards has increased in art education literature in recent years, most teachers continue to work the way they have always worked and use materials that have been stand-bys for many years (p. 45).

Art teachers should be knowledgeable about possible toxic ingredients in art materials; they should substitute non-toxic for toxic materials whenever possible and establish policies for the safe use of art products. Teachers need to identify high-risk children and take special precautions to see that their learning activities are also safe, given their special needs.

To minimize the risk of accidents occurring in the classroom, teachers need to provide careful instruction and supervision in the safe use of cutters, power tools, and kilns.

Canopy hoods, spray booths, and exhaust fans must adequately remove contaminated air and fumes from the classroom. Safety equipment and clothing must be available when needed. Signs that instruct, warn, and remind should be on or near cutters and power equipment. Student competency tests in art health and safety are essential to safeguard the students from harm. Maintenance of complete health and safety records are essential for protecting the teacher from litigation.

In summary, the literature suggests that it is time for teachers to find new ways to work and to use non-toxic materials whenever possible, in order to provide a safer and healthier learning environment for themselves and their students.

CHAPTER III

Research Methodology

Classroom art educators teach with a variety of materials. Each instructional situation is as diverse as the multitude of art products found in any classroom studio. Individual teachers also vary in their level of knowledge and concerns about studio health and safety. In order to gain more knowledge about health and safety in the art classroom, three public school art teachers were interviewed, and their classroom studios were evaluated. The purpose of this procedure was to identify some of the strengths and weaknesses of these art programs as the programs relate to health and safety.

Interview Construction

In order to determine how art teachers deal with health and safety, an interview schedule was developed. Information from available literature and related research provided the foundation for the questions used in the interview. Questions were based on studio classroom health and safety practices currently accepted as safe by most authors and researchers in the field. Most of the questions were open-ended in order to evoke more informative and complete responses from the subjects. The

first 50 questions were divided into three areas: (a) educational background of the teacher in relation to artroom health and safety, (b) teacher awareness of specific health and safety issues, and (c) the content of classroom health and safety instruction. The second section of the interview was comprised of a checklist of 25 items dealing with art classroom health and safety conditions, and was used to evaluate the current conditions of these teachers' studio classrooms. The third section of the interview made inquiry into the use of eighteen hazardous art materials and processes. This section was included to determine whether these materials and processes were being used in the subjects' classrooms.

Pilot Study

A pilot study was conducted with an art teacher in a school similar to the sample schools. The purpose of this pilot study was to determine the duration of the interview and the effectiveness of the questions in evoking informative responses from the subject. The interview took approximately one hour to complete, and the questions produced what were judged as useable answers from the subject. The interview was recorded on a Panasonic tape recorder (Model # RQ-2108) to expedite

the interview and facilitate accuracy in collecting subject responses.

Selection of Subjects

Criteria for the selection of subjects was based primarily on teaching status and school enrollment size. Full time art teachers in small rural community schools in northeast Iowa were included in the pool of possible subjects. From this pool, three art teachers were selected, and initially contacted by telephone. All three teachers agreed to participate as subjects in the study and appointments for the interviews were made. In order to maintain confidentiality after the interview, code names were used to identify the subjects and their schools.

Data Collection

The three interviews of the subjects and subsequent evaluations of their classrooms were conducted on April 10, 1991. All three interviews were conducted on the same day to maintain interviewer consistency.

Each interview and studio classroom evaluation lasted approximately one hour and fifteen minutes. As with the pilot study, the three interviews were recorded on a Panasonic tape recorder (Model # RQ-2108). After the interviews were completed, the responses from subjects were transferred from

tape recordings to note cards. The data were then ordered into categories conventionally found in art classroom health and safety literature. Data were analyzed using content analysis, as described by Gay (1987). Data analysis involved the comparing and contrasting of subject responses to the interview questions and of materials and safety practices evident within the three classrooms.

CHAPTER IV

Analysis of Data

This chapter analyzes the health and safety data extracted from the interviews with the subjects and the checklist evaluations of their classrooms. The analysis considers (a) the background of the subjects and the art activities regularly performed in their classrooms, (b) the health and safety education of the subjects, (c) the subjects' awareness of specific health and safety issues, (d) the methods of health and safety instruction practiced by the subjects in their classrooms, and (e) the health and safety conditions in the subjects' art classrooms.

Background of Subjects and Regular Art Activities

The first subject was a full time, female art instructor with 13 years experience. She was teaching 175 students in kindergarten through twelfth grade. For the purposes of this study, she is referred to as "Ms. Jones" and her school is referred to as "Jonesboro School."

There were approximately 700 students enrolled at Jonesboro School. The art students at Jonesboro School used turpentine, permanent markers, unlabeled wheat paste, and cold water dyes in the classroom studio. They did tie-dye, batik,

oil painting, etching, engraving, and sand-blasting. Sometimes they pulverized dry clay to re-use it. Some of their oil paints contain cadmium, and they used lead-bearing glazes on their pottery. The elementary students were not allowed to use the lead glazes and the secondary students were instructed not to use lead glazes on ware that will come into contact with food or drink.

The second subject was a full time, male art instructor with 22 years teaching experience. He taught 200 seventh through twelfth grade students. He is referred to as "Mr. Thomas" and his school is referred to as "Thomasville School."

There were approximately 850 students enrolled at Thomasville School. The art students used turpentine, permanent markers, and cold water dyes in the classroom studio. They also pulverized dry clay to re-use it, and they did tie-dye.

The third subject was a full time, male art instructor with 21 years teaching experience. He taught 84 sixth through twelfth grade students. He is referred to as "Mr. Allen" and his school is referred to as "Allenton School."

There were approximately 700 students enrolled at Allenton School. The art students used permanent markers and cold

water dyes in the classroom studio and they occasionally used turpentine. They also did tie-dye and batik.

Health and Safety Education of the Teacher

None of the subjects recalled taking any courses during their college preparation which dealt with health and safety in the art classroom. Ms. Jones did attend a workshop after beginning her teaching career that stressed safety in the classroom. However, the other two subjects did not remember attending any workshops, seminars, or other instructional programs in classroom health and safety. None of the subjects had actively sought out any of the books, pamphlets, or videocassettes that address health and safety in the arts.

Teacher Awareness About Specific Health and Safety Issues

Toxic Art Materials.

All three subjects expressed concern about toxicity in the materials they use in the classroom. Ms. Jones was concerned about the lead in the glazes used in her classroom. She was also concerned about the aerosols which were sometimes sprayed in the room. Although Ms. Jones indicated that she did not always read all safety labels on art products, her concern about toxicity in materials had caused her to switch to a non-toxic brand of tempera paint for her elementary students.

Mr. Thomas expressed concern about toxic airbrush fumes, the use of certain kinds of paint, and the use of turpentine in his classroom. His concern about the toxicity of materials has caused him to switch from oil paints to acrylic paints for painting activities. He also has discontinued the use of lead-bearing glazes in his classes. Mr. Thomas indicated that he always reads the safety labels on art products purchased for the classroom.

Mr. Allen was concerned about the use of rubber cement, varnish, solvents, and some of the clays and glazes. His concern about toxicity has caused him to discontinue the use of solvent-based silk screen in his classes. Mr. Allen reported that he reads most safety labels on purchased art products.

Ms. Jones indicated that price was the deciding factor when she purchased products for the classroom. However, health warning labels also affected what she bought, especially for the elementary students. Mr. Thomas and Mr. Allen stated that toxicity was the deciding factor when making purchases for their classrooms.

None of the subjects restricted students from putting gum in their mouths while engaging in art activities nor had they issued any warning about the hazard of doing so. Ms. Jones and Mr.

Allen reported that they did not check for cuts or open sores on their students' hands when the students worked on certain projects like pottery or glazing. Mr. Thomas reported that he did however, check his students' hands when they worked on clay projects. None of the subjects required their students to wash their hands each day before the students left the classroom. All three teachers said they expected their students to wash after working with "dirty projects" like clay or charcoal.

All three subjects purchased clay and glazes in wet form, and students in all three schools were involved in cleaning the clay areas of the art classroom. Ms. Jones and Mr. Thomas reported that sweeping occasionally took place during the cleanup of clay activities, whereas Mr. Allen indicated that clay areas were not swept. The students at Allenton School instead used sponges and water during the cleanup to alleviate dust. None of the subjects had alerted their custodians about the hazards of sweeping clay and glaze dusts. Mr. Thomas and Mr. Allen said that they assumed their custodians knew about such hazards.

None of the subjects had provided their school nurses or local physicians with information that might be used to diagnose an acute or chronic illness resulting from chemicals in art materials or dusts in their studio classrooms. None of the

subjects had ever requested a Material Safety Data Sheet from the manufacturer for any chemical or art material used in their classroom. Ms. Jones and Mr. Allen had not posted the telephone number for the nearest Poison Control Center. Mr. Thomas had that telephone number posted on the wall near his desk.

Accidents in the Art Classroom.

Ms. Jones and Mr. Thomas reported concern about accidents or illnesses arising from procedures used in the classroom. Ms. Jones was worried about students having an accident while using power tools, carving tools, and while using a sandblaster. Mr. Thomas was concerned about students cutting wire with a wire cutter. He indicated that he had instructed them to close their eyes when the wire was ready to break off. Mr. Allen expressed no concern about possible accidents or illnesses arising from procedures performed in his classroom.

All three subjects were concerned about accidents occurring due to the conditions of their classrooms. Ms. Jones was concerned about the small size of her classroom which she believed could cause a student to injure another student accidentally, perhaps with a cutting tool. Jonesboro School is currently building a larger art facility which should soon alleviate

this problem. Mr. Thomas was worried about the large number of students in his room which he felt could contribute to an accident happening. Mr. Allen was worried about having the kiln located in his classroom. He expressed concern about the toxic fumes emitted during the firing process.

All three respondents required that safety glasses be worn when working with power tools. Ms. Jones required the use of safety glasses when her students did sandblasting. However, she did not require that a dust mask or respirator be worn during this activity. Mr. Thomas required the use of safety glasses when his students worked with stained glass, power tools, and when they were sanding and filing. Mr Thomas said that he had difficulty enforcing his requirement that students wear dust masks while working with these projects because the students were unwilling to wear them. Mr. Allen required his students to wear safety glasses when using power tools or carving tools and to wear a dust mask when working with the airbrush.

Two of the subjects reported that accidents had occurred in their classrooms. Ms. Jones said that one of her students had been cut seriously enough on the hand to require stitches, when the students were working with cutting tools. One of Mr. Thomas' students was injured when he fell from a scaffold while

participating in a mural project. Another student got rubber cement in his eye and required medical treatment to have the rubber cement removed and the eye cleaned. Mr. Thomas said that this particular accident happened because the students were "dorking around." A few other students had required stitches for cuts arising from their work with carving tools. Mr. Allen reported that he could not remember any accidents that had occurred in his classroom. However, he did mention having a pregnant student vomit each time she was in the room when they were working with solvent-based silk screen. As was noted previously, the students at Allenton School no longer work with solvent-based silk screen.

Ventilation in the Art Classroom.

Ms. Jones reported that strong fumes congregated from the kiln when it was operated during the school day. She did not have the kiln vented. Mr. Thomas fired his kiln during the day in an unattended room which was not ventilated. There was no exhaust hood or room ventilation in the room where his kiln was located. Mr. Thomas also used an unvented enameling kiln in his art room. Mr. Allen fired his kiln during the day in the classroom. However, his kiln had a canopy hood over it to vent the fumes outside.

High-Risk Students.

None of the subjects had actively screened their students, prior to instruction, for hemophilia, allergies, or respiratory or other health problems. The three subjects indicated that their school nurses were responsible for identifying students with medical problems and then notifying the teachers about these students. All three subjects said that they assumed any necessary medical background information would be supplied to them. None of the subjects had issued any warnings about the increased health hazards of working with toxic ingredients to students who smoke.

Administrative Support of Classroom Health and Safety.

Ms. Jones reported that she felt somewhat intimidated about asking her administration for expensive safety equipment such as a ventilation system. She considered administrative support to be rather limited in relation to artroom health and safety at Jonesboro School. Mr. Thomas said he felt that the principal at Thomasville School was very supportive of making the classroom safe. For example, the principal authorized that an exhaust fan be installed in the artroom after Mr. Thomas indicated to him that one was needed. Mr. Allen was initially unsuccessful in getting a canopy hood to vent the fumes from the kiln at

Allenton School until he threatened to contact OSHA (Occupational Safety and Health Administration). Installation of the hood was begun immediately.

Teacher Concern About Legal Liability.

The subjects were asked if they were concerned about their legal liability should an accident or an acute or chronic illness occur due to the nature of health and safety conditions in their classrooms. Ms. Jones said that her concern prevented her from ever leaving the students alone in the art classroom. Mr. Thomas said that his concern about legal liability had caused him to require his students to use ladders instead of scaffolds when they do murals, because he considered ladders safer than scaffolds. Mr. Allen said he ceased to be concerned about legal liability after he stopped teaching solvent-based silk screen in the classroom.

Methods of Health and Safety Instruction Practiced by the Teachers in the Classroom

Ms. Jones and Mr. Thomas reported that they did not write health and safety instruction into their curriculum, nor was it included in their lesson plans. Mr. Allen had incorporated health and safety into his curriculum and occasionally it was written into his lesson plans.

None of the subjects used handouts or videos about health and safety in their classrooms. However, Mr. Thomas and Mr. Allen reported that they began certain projects with a discussion of safety as related to the project to be done. Ms. Jones and Mr. Thomas did not report giving any written competency tests concerning health and safety. Mr. Allen said he gave a written competency test before the students were allowed to use power tools. These tests were then retained in his possession. This action of retaining these tests might imply a concern about legal liability. However, Mr. Allen stated that he kept all tests to prevent the students from copying information from an earlier test. None of the subjects used written tests to evaluate their students' awareness of potential chemical or material hazards.

Art Classroom Health and Safety Conditions

During the evaluation of the health and safety conditions of the subjects' classrooms, several potential hazards were noticed in each classroom. Ms. Jones stored chemicals or materials in unlabeled baby food jars or other non-original containers. Ms. Jones and Mr. Allen had power buffing wheels without safety shields attached. Mr. Allen, however, stated that the buffing wheel in his classroom was for his personal use only.

None of the subjects had fireproof storage facilities for flammables within their classrooms, despite the fact that there were flammable materials in all three classrooms. All three subjects disposed of paint rags by throwing them in the garbage. Mr. Thomas indicated that cloth rags were washed at school and paint soaked paper towels were put in the waste basket. Mr. Allen had his students place the soiled paint rags in a plastic bag and the bag was then placed in the garbage. Ms. Jones disposed of used solvents along the outside of the school building. The students at Thomasville School poured used solvents down the drain in the classroom sink. Mr. Allen's students put used solvents in the waste basket.

Ms. Jones and Mr. Thomas did not have a spray booth in their classrooms. Both relied on an exhaust fan and/or open windows to provide ventilation in their studios. Mr. Allen had a spray booth and his windows were also opened for ventilation.

The students of all three subjects used rubber cement in the classroom. Ms. Jones and Mr. Thomas reported the use of turpentine in the classroom. Mr. Allen used mineral spirits, a solvent which is much safer than turpentine.

None of the subjects had warning signs on the cabinets that contained flammables. Ms. Jones and Mr. Allen had no warning

signs on the paper cutters in their rooms. Ms. Jones and Mr. Thomas did not have NFPA (National Fire Protection Association) signs on the entry doors of their classrooms.

None of the subjects had MSDS (Material Safety Data Sheets) for any chemicals or materials in their rooms. Ms. Jones had no first aid kit in her studio and Mr. Thomas had only adhesive bandages and a disinfectant in his classroom. Mr. Allen had a first aid kit attached to the artroom wall.

Summary

The analysis of data has revealed that the three subjects had not actively sought out information about health and safety in the arts. Books, pamphlets, and videocassettes about art studio health and safety apparently did not exist in their classrooms.

The subjects' concern about toxic art materials had prompted them to make some substitutions of materials and processes. However, other hazardous products were still used and other dangerous processes were still performed in all three classrooms. Rubber cement, permanent markers, turpentine, and cold-water dyes were the most common hazardous materials in their artrooms; tie-dye and batik were the most common hazardous processes performed in their studios.

None of the subjects had discussed material hazards with their school nurses or local physicians. All three subjects assumed that their school nurses would identify high risk students, although their nurses may not have been aware of this responsibility. Two of the subjects expressed concern about accidents occurring in their studios. Accidents had, in fact, happened in these artrooms. The most frequent accidents were hand wounds while the students were working with cutting tools. The three subjects required their students to wear safety glasses when they work with power tools. Two of the subjects required their students to wear dust masks when spraying; however, one of these respondents reported having difficulty enforcing this important requirement.

Ventilation was a concern for all three respondents. One of the subjects had a canopy hood over his kiln and a spray booth in his studio. One subject fired his kiln in an unattended room in the school. This activity could contaminate the entire school with fumes from the kiln. He did not have a spray booth; instead he relied on an exhaust fan to remove odors and fumes from his studio. The other subject fired her kiln with only an exhaust fan to remove the fumes from the classroom. She also did not have a spray booth in her studio.

The students at two of the schools swept clay areas during cleanup activities which means that they probably were inhaling harmful dusts. The custodians at all three schools were also likely to be inhaling harmful dusts when they cleaned the artrooms.

None of the subjects had approved storage facilities for flammables or waste solvents and solvent-soaked rags. The subjects disposed of used solvents in the garbage, down the drain in the sink, or along the outside of the school building.

Two of the subjects expressed concern about legal liability if an accident or illness occurred due to health and safety conditions in the classroom. However, (a) none of the subjects used handouts or videocassettes for lessons in classroom health and safety; (b) only one subject gave his students a competency test about the use of power tools; (c) there were no signs in any of the classrooms to warn, remind, or instruct students about the safe use of cutters and power equipment; and (d) none of the subjects used written tests to evaluate their students' awareness about potential chemical or material hazards. Discussion appeared to be the most common way to provide the students with information about health and safety in the arts.

CHAPTER V

Summary

The purpose of this study was to investigate (a) the extent of teacher education in health and safety, (b) the extent of teacher awareness of specific health and safety issues, (c) the nature of adjustments of techniques and materials to reduce hazards in the art studio, (d) the nature of safety conditions of the classroom for which the art teacher is responsible, and (e) the amount of instruction provided to the students about health and safety in the arts. The investigation began with a review of literature and related research to identify currently accepted health and safety practices for the studio. The literature provided information about toxic materials in the arts, hazardous processes and equipment in the studio, classroom ventilation, education of students about health and safety in the arts, and teacher liability. Based on this information, an interview for art teachers was constructed. A pilot study was conducted to determine whether the interview questions effectively evoked informative responses from the subjects. The interview was then conducted with three art teachers in schools located in northeast Iowa.

This inquiry was not a quantitative study; thus the findings cannot be considered fully reflective of common art classroom conditions. However, the data have revealed the state of health and safety practices related to art classes in the schools examined. It is possible that the health and safety practices described here are similar in other schools. Some schools may be safer. Others may be more hazardous.

Observations

Although none of the subjects have purposely obtained any information or education about health and safety in the arts, their concern about toxicity in art materials has caused them to make some substitutions of less toxic materials for more toxic materials, and to exclude other materials. Perhaps these teachers gained their understanding of various hazards through informal means such as peripheral reading, conversations with other art teachers, or by reading safety labels or health warnings on various products. Although the subjects expressed concern about toxic ingredients, hazardous materials were still present in their rooms.

All three subjects purchase clay in wet form. This suggests that they are aware of the dangers of inhaling clay dust when it is mixed with water. However, sweeping should be replaced

with wet mopping in clay areas. Custodians should also be alerted to the dangers of sweeping clay and glaze dusts. Assuming that the custodians know about the hazards in the arts is an invalid excuse for not alerting them.

The students are expected to wash their hands after working with dirty materials; however, some toxic materials might not be considered dirty. The students' hands and arms could also become contaminated with toxic ingredients if the tables are not thoroughly cleaned after a prior activity. Washing hands and arms, as well as washing table tops should be required each day. None of the subjects restrict their students from putting gum in their mouths while working on projects. This is an easy way for toxic materials to accidentally become ingested.

Ms. Jones said that she was irritated by the strong fumes during the days when the kiln was firing. Prior to the interview there was no plan for a canopy hood over the kiln in the new artroom being built at Jonesboro School. As a function of the interview, her concern seemed to rise, because she subsequently requested photocopies of relevant literature to present to her administrators. This kind of behavior indicates that simple awareness may ultimately result in actions designed to reduce hazards.

The three subjects rely completely on the school nurse to identify high-risk children, but the subjects may not be aware of the criteria the nurse uses for the identification of these students. Teachers should obtain a thorough health background of the students and any special needs by sending home a questionnaire for parents of art students to answer.

The subjects who expressed concern about accidents happening in their classrooms should be concerned. In several ways, these classrooms were quite hazardous, despite the teachers' efforts in this area. For example, using a sandblaster certainly should require the use of some sort of breathing apparatus. The use of safety glasses is preferable to instructing students to close their eyes when cutting wire.

Due to the nature of the accidents that have already occurred in their classrooms, one would expect to see measures taken to prevent these accidents from happening again. For example, signs should be posted in the classroom to remind the students how to use toxic materials and dangerous equipment safely. Discussions and demonstrations of the careful use of hazardous materials and tools is also important; however, warning signs can serve as a useful reminder to those students who forget easily.

Teachers should test the students' knowledge of studio tools and materials before these objects are used in the classroom. Teachers should also maintain accurate health and safety records. If an accident or illness occurs in the art classroom, these records may become useful to the teacher in avoiding a lawsuit charging negligence.

Conclusions

The information collected from the subjects in this study was interesting and enlightening. From these data, the following conclusions have been reached:

1. Teachers are likely to be concerned about toxicity of art materials and processes, and about accidents in the classroom.
2. Unfortunately, this level of concern may not be great enough to cause those teachers to seek health and safety information actively, and/or to pursue vigorously health and safety education in the art classroom.
3. Teacher awareness of health and safety in the arts may not be great enough to cause teachers to take all precautions deemed necessary and appropriate by current literature and/or research.

4. Teacher awareness of their legal liability may not be great enough to cause teachers to take the necessary precautions to make the classroom as safe as possible, and in that process, protect themselves from litigation.

Recommendations

Teachers are responsible for providing a safe and healthy learning environment for their students. Art hazards in the schools may represent a significant problem. Children should be taught about the dangers of working with hazardous materials and processes, just as they are taught about fire prevention, drug abuse, and personal hygiene. Based on the review of literature and the information collected from this study, it is recommended that:

1. Art teachers must be sufficiently educated in classroom health and safety. Teachers should acquire pamphlets, books, or videocassettes and study them vigorously to become more aware of art hazards. Workshops on health and safety in the art classroom should also be available for art teachers to attend.
2. Teachers must strive to minimize the risks involved in working with hazardous art materials and processes. Efforts must be made to insure that the safest materials and

processes are used in all art activities, regardless of expense.

3. Teachers must maintain a classroom that is conducive to safe and healthy learning for all students. High-risk students need to be identified by the art teacher to insure that the studio activities do not pose additional dangers to these persons.
4. Teachers must educate their students about the safe use of materials and processes in art. Discussions, demonstrations, warning signs on equipment, written competency tests about hazardous materials and processes, and performance competency tests must be standard in the art classroom.
5. Teachers should protect themselves from litigation by maintaining accurate records of written health and safety instruction and competency tests.

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Appendix A

Informed Consent Statement

Researcher: George Killian

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Advisor: Melissa Heston (319) 273-2236

The purpose of this study is to determine the level of teacher concern about health and safety in the art classroom. Data for the study will be collected from an interview with the subject, followed by an evaluation of classroom conditions according to a prepared checklist. The classroom evaluation shall be conducted by the researcher and the subject.

The identification of subjects and their schools will not be included in the research paper and will be known only to the researcher. Code letters will be used in the data collection and analysis.

Your participation as a subject in this study is strictly voluntary. You will not be paid for your participation. It is unlikely that any discomfort or anxiety will occur as a result of this study, however you may discontinue participation at any

time or you may refuse to participate entirely.

The results of this study will benefit art educators, curriculum planners, and other researchers when addressing art classroom safety. If you would like a copy of the manuscript, please provide the researcher with your mailing address and a copy will be sent to you upon its completion.

For answers to questions about the research and about your rights as a research subject, you may contact the office of the Human Rights Coordinator, University of Northern Iowa, (319) 273-2748.

I am fully aware of the nature and extent of my participation in this project as stated above and the possible risks arising from it. I hereby agree to participate in this project. I acknowledge that I have received a copy of this consent statement.

 (Signature of subject or responsible agent.) (Date)

 (Printed name of subject.)

 (Signature of investigator.)

Appendix B

Teacher Interview:

Health and Safety in the Classroom

(Complete the following information before beginning the recording.)

1. Name of teacher.
2. Name of school.
3. Male/female
4. Years teaching experience.
5. Present number of students.
6. Present number of secondary students.
7. Grade levels presently being taught.

(Begin recording, IDENTIFY BY CODE LETTER.)

Educational Background in Classroom Health and Safety

8. List the courses taken during your college preparation dealing with health and safety.
9. List the courses, workshops, or seminars on health and safety you've taken since graduation from college.
10. List any books, pamphlets, videos, or any other published material you've purposely obtained on classroom health and safety since you've begun teaching.

Teacher Awareness About Specific Health and Safety Issues

11. Are you concerned about the toxicity of materials presently being used in your classroom? (If yes, explain.)
12. Are you concerned about accidents or illnesses arising from current procedures, tools, or materials used in your room? (If yes, explain.)
13. Are you concerned about accidents or illnesses arising from the existing conditions of your classroom? (If yes, explain.)
14. Are you concerned about legal liabilities should an accident or an acute or chronic illness occur due to the nature of health and safety conditions in your classroom? (If yes, explain.)
15. To what extent are the CP, AP, and HEALTH LABELS on art materials a deciding factor when you purchase supplies?
16. How have you identified any hemophiliacs in your classroom?
17. How have you identified any students with allergies in your classroom?
18. How have you identified any students with respiratory or other health problems in your classroom?

19. How have you identified students who smoke or use other tobacco products in your classroom?
20. What types of warnings have you issued to the aforementioned groups about synergistic effects?
21. Do you systematically check for cuts or open sores on your students' hands when beginning certain projects? (If yes, when?)
22. Do you read all safety labels on all materials used in your classroom?
23. To what extent does the level of toxicity influence the purchases you make for the classroom?
24. What do you do with a product that you suspect may be dangerous to use, but has no safety label or label of contents (for example, a solvent or rubber cement)?
25. Who is involved in cleaning clay areas in the room?
26. What methods are used to clean the art room, specifically the clay areas?
27. Have you alerted your custodians about the possible hazards of cleaning clay, plaster, and glaze dusts?
28. Who is involved in mixing clay, plaster, and glazes?
29. Do you require that safety glasses be worn when working with certain materials or equipment? (If yes, when?)

30. Do you require that a respirator or dust mask be worn when working with certain materials? (If yes, when?)
31. Do you require that protective clothing, gloves, or barrier creams be used when working with certain materials?
32. Do you use any lead or cadmium paints/glazes in the classroom?
33. When do you require that students wash their hands before leaving the classroom?
34. When do you restrict your students from putting gum in their mouth while working in the classroom?
35. When do you fire your kiln?
36. Are there any hazardous steps in certain art techniques that you perform when the students are not present? (If yes, explain.)
37. List any substitutions of products you've made due to concern about toxicity.
38. Have you alerted your school nurse or local physician about any information that might enable them to diagnose an acute or chronic illness resulting from dusts or art materials used in your classroom?
39. Have you requested a Material Safety Data Sheet for any chemical or art material in your room?

40. Do you have the phone number readily available for the nearest Poison Control Center? Methods of Health and Safety Instruction
41. To what extent is health and safety included in your curriculum?
42. Is health and safety instruction included in your lesson plans?
43. Do you begin each project with lessons or discussion in health and safety?
44. What handouts, videocassettes, or other sources of health and safety information do you use in class?
45. What kinds of competency tests on health and safety do you give to your students?
46. If written competency tests are used, are they retained in your possession?
47. How do you test your students on potential chemical or material hazards?
48. List any accidents that have occurred in your room and describe procedures taken to prevent similar problems from happening again.
49. List any health or safety related concerns you have pertaining to your art program.

50. Describe any administrative support or lack of support you've encountered when requesting safety equipment, materials, training, or literature.

Art Classroom Health and Safety Conditions

(Provide a written description and/or comments after each item.)

- | (ITEM) | (COMMENTS) |
|--------|------------------------------|
| 51. | Correct containers/labels. |
| 52. | Power tools |
| 53. | Fireproof storage. |
| 54. | Storage of paint rags. |
| 55. | Safety shields in place. |
| 56. | Kiln ventilation. |
| 57. | Location of kiln. |
| 58. | Spray booth available. |
| 59. | Room ventilation. |
| 60. | Kinds of adhesives used. |
| 61. | Kinds of solvents used. |
| 62. | Methods of solvent disposal. |

63. Signs placed in the artroom:
 - (a) power equipment
 - (b) storage of flammables
 - (c) exhaust hoods
 - (d) paper cutter
 - (e) other cutting tools
 - (f) NFPA signs
 - (g) MSDS sheets posted
 - (h) other
64. Protective clothing
65. Eye protection
66. Respirators or masks
67. First aid
68. Floors
69. Dust accumulation
70. Cutter edges
71. Oil Paints
72. Glazes
73. Markers
74. Printing inks
75. Other

Hazardous Materials and Processes

(Check the following items and provide comments if they are used in the art classroom.)

Paintstripper

Varnish remover

Laquer thinner

Turpentine

Gasoline

Acetone

Unlabeled wheat paste

Fibro-Clay

Permanent Markers

Airplane glue

Cold water dyes

Mixing dry clay

Batik

Tie-dye

Silk screen

Stained glass

Block printing on fabrics

Oil painting

(End recording)