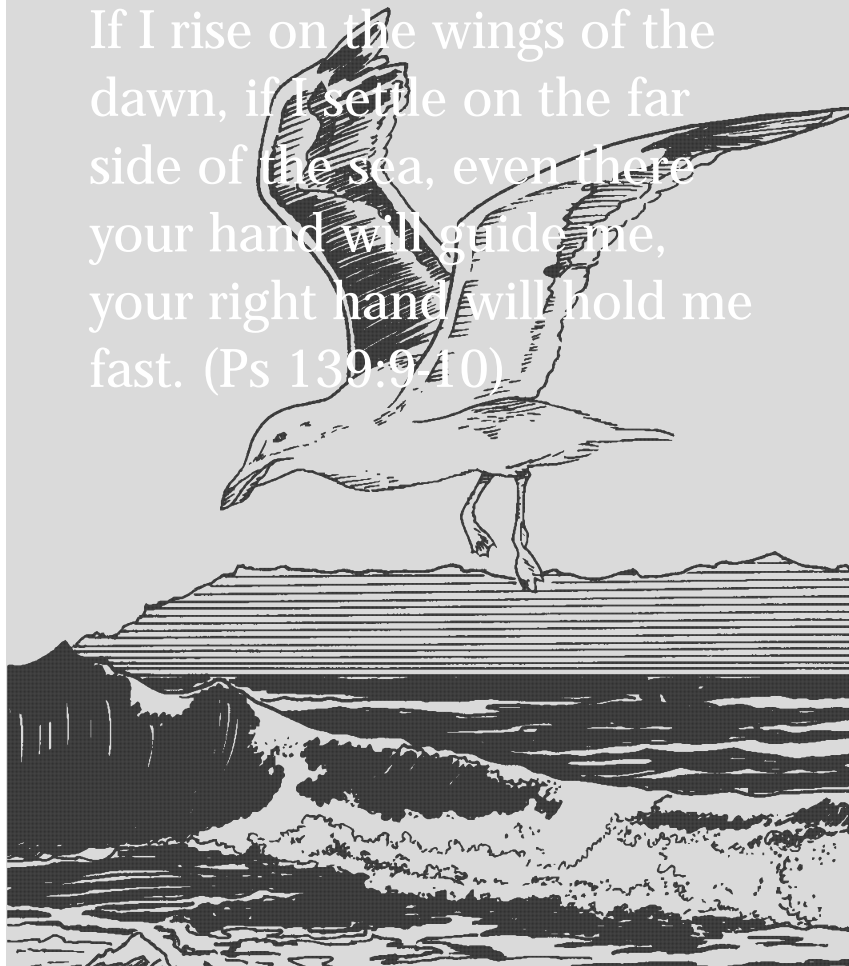


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NUMBER 3  
FEBRUARY 1994

# The Lutheran Educator

The WELS Education Journal

If I rise on the wings of the  
dawn, if I settle on the far  
side of the sea, even there  
your hand will guide me,  
your right hand will hold me  
fast. (Ps 139:9-10)



# The Lutheran Educator

The education journal  
of the Wisconsin Evangelical Lutheran Synod  
edited by the faculty of Dr. Martin Luther College

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**Editor** — John R. Isch

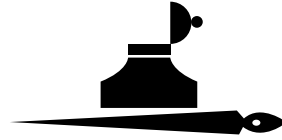
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**“...not...first..., Nor...last....”**

Scarcely a week goes by that we don't read or hear about the sad state of American education or the latest attempts to correct this situation. Some say our wake-up call occurred in the late 1950s when the Soviets launched Sputnik I. Our response took the form of shaping new curricula for the schools—the new math, science, and English, among others. On the delivery end came the call for departmentalized instruction, one of the factors which led to the development of areas of concentration in DMLC's "new" 1968 curriculum.

These attempts to stem the tide of falling SAT scores and rising crime rates were followed in succeeding decades by proposals for the adoption of a fifth year of teacher education, by an emphasis on programmed instruction involving the use of computer technology, by the development of open classrooms and magnet schools, by the suggested implementation of the "whole language" philosophy, by the assessment of both teachers and learners through the use of such instruments as the National Teacher Exam and the goals of Outcome Based Education, and, most recently, by the heralded advent of "distance learning," involving the latest advances in technology.

The question remains how we, as Christian educators, are to respond to these suggested solutions for a national problem which also involves our Lutheran school system. Once again, the wise words of Alexander Pope from his "essay on Criticism" are worth our consideration: "Be not the first by whom the new are try'd, Nor yet the last to lay the old aside" (11, 335-336). These words advocate the sensible pursuit in life of the golden mean. For the Christian educator, this pursuit involves following Paul's advice from 1 Thessalonians 5:21—"Test everything. Hold on to the good." Such testing takes time to study the feasibility of the proposed solution before determining a course of action. That is why we will not want to "be the first by whom the new are try'd."

In the mid 60s, a Michigan school district adopted the Roberts English series for all grades one schoolyear and abandoned it the next. What the overzealous governing board had neglected to do was to provide its teachers with the necessary orientation to this new curricular thrust in one of the many workshops which were offered in successive summers—a case of first to try and first to let go!

But such testing also forces us to be open-minded about suggested solutions, not stubbornly resistant, for only then will Pope's words apply to us—"Nor yet the last to lay the old aside." "Not the first...Nor last" should be our motto as we strive for the golden means in our personal and professional lives!

MDS

## It's All Spanish To Me

Ministering to the developmentally disabled in our congregations

Geoffrey A. Kieta

**P***adre nuestro, que estas en los cielos, santificada sea tu nombre. Venga a nos tu reino. Hagase tu voluntad asi en la tierra como en el cielo ...*

Do these words sound familiar to you? They should—they're words that you have known since you were a little child. With a little imagination, you can probably recognize them as the Lord's Prayer. But in this form at least, they lack that familiar Sunday morning ring that you're used to. But these words are exactly the words that you and I have grown up with.

My wife and I have had to struggle with these words and many others like them since we came to Mexico. We're here studying Spanish so that we can go to our synod's mission in Colombia. While we are in Monterrey, we attend the WELS mission church here. Every Sunday we stumble through the Spanish version of page five and fifteen.

The versicles and responses we have known since we were children don't sound quite right to us in Spanish. We know where we are in the service, not because we necessarily understand what's happening, but because we know what is supposed to come next. We can

“get the gist” of the liturgy because we have done it thousands of times before in English. But when the pastor climbs into the pulpit, we leave that familiar ground.

After a month in Mexico, we don't get much out of the sermon. We are not alone in that experience. In reality, there are many people in the United States who don't get much out of the sermon, either. Their problem, though, isn't that the sermon is being preached in Spanish. Their problem is that they are developmentally disabled—what we used to call mentally retarded.

Although I worked with developmentally disabled adults for a number of years, I don't think I ever truly appreciated what their lives are like until I came to Mexico. In Mexico, I'm lucky if I catch three quarters of what somebody says to me. In Mexico, I can't get where I'm going unless somebody takes me, or very carefully explains the way. In Mexico, I stand out in a crowd because I don't dress, or act, or talk the way everybody else does. Many times, I feel what I think a developmentally disabled person feels. I just don't get it. I don't know for sure what all the rules are, let alone how I broke them.

The sad thing is, those feelings of

frustration and confusion extend to the church as well. My wife and I try not to do anything that might offend anyone, but God only knows if we succeed or not. Mexicans are very profuse in their greetings and their small talk. I hope that Christian charity prevails when we act like impatient gringos, but I don't really know for sure.

“

*Ministry to the developmentally disabled is a ministry of love and encouragement.*

”

There is a strong parallel to the developmentally disabled in our church today. Many congregations—probably more than you realize—have developmentally disabled people attending them. Nearly all of our congregations have potential members among the developmentally disabled community. These people struggle with some of the same issues that my wife and I are struggling with right now. They don't know all the rules. They don't know how to ask what the rules are. Often, they don't dress or talk as we do. They want to be a part of a Christian congrega-

tion, but God in his infinite wisdom and mercy has gifted them in different ways than he has gifted most of the rest of us. That makes them difficult to understand or accept.

These Christians need the same strengthening and encouragement in their faith that you and I need. St. Paul tells us, “Don't give up meeting together as some are in the habit of doing.” Paul exhorted us to meet together because God works through the fellowship and encouragement of other Christians. Each one of us needs the ministry that Christ gave to the church to strengthen our faith through the means of grace.

What can you as teachers do to enhance your congregation's ministry to the developmentally disabled? That's a tough question. The answer, as I see it, really consists of two other questions. What can you do to change the attitudes of the congregation toward the developmentally disabled? And what can you do to minister to the developmentally disabled?

Whether you are comfortable with the idea or not, you, the Christian elementary school teacher, are influential in your congregation. The members of our churches entrust you with the education of their children and ask you to assist in teaching them Christian values. The Holy Spirit called you to use that influence for the good of the Church.

One way that you can exercise your Christian influence is by teaching the children in your classroom to view every person (including themselves first of all) the way that Christ views him or her. God loves all people. Christ died

for everyone, even the developmentally disabled. Christian love reaches out to all people. Christ values the humble, simple faith of the developmentally disabled as much as the faith of the pastor or church council president. Our children need to understand that in God's view, they are no different from the "retard" they want to make fun of. All are sinners who deserve hell. All are saints who inherit heaven through the love of Christ. One way to respond to Jesus' love for us all is to show love to those who are different from us.

Your influence doesn't stop with the children, however. It is a sad reality that we adults often display an attitude that is as bad or worse than that of our children. We need to recognize in ourselves this lack of love for and acceptance of others as a sin. But it is a sin that is paid for and forgiven. Forgiveness breeds love and acceptance. You can help to set the tone of love and acceptance for all people in your congregation by the example you set. When you show your love for your Savior overflowing to all the members of your congregation, you teach love and acceptance. Ministry to the developmentally disabled is a ministry of love and encouragement that flows naturally from a congregation that is mature in its faith. You, the called worker, help to guide the congregation to greater depths of faith by your life and your words.

But that isn't the only avenue open to you. The developmentally disabled person shares the greatest need of all people: to hear the gospel. The difficulty for the developmentally disabled

Christian is understanding the gospel when he or she hears it. We Lutherans believe that the Holy Spirit works through the gospel message. But that message isn't some kind of "hocus pocus" formula. People need to understand the truths they hear. But for the developmentally disabled person, understanding the gospel is more difficult than it is for the rest of us.

For the developmentally disabled person, learning and applying the simple truths of Scripture—the lessons you teach in Bible history every day—are challenges. I believe that it is like what my wife and I experience on Sunday mornings in Mexico. We don't quite get it all. We may have an idea what's happening at any given moment—but it all happens so fast and there are so many words we just don't know. Sunday morning in any WELS congregation is probably very much like that for the developmentally disabled Christian. There is so much to understand, but so little is comprehended.

That's really where you come in. You are the congregation's expert in education. Your training and experience make you invaluable in reaching out with the gospel to people who have difficulty in learning. You can make a difference in the lives of these children of God.

Every situation is different. In some congregations, there may well be people who would love to be involved in bringing the gospel to the disabled, but feel inadequate to the task. In those situations, your place may be to teach the teachers. With your training, you can be a resource person or even a coordi-

nator of a larger effort. In other places, a Jesus Cares program with identifiable needs may already be a part of the congregation's ministry. Where no outreach is currently going on, you may want to encourage your congregation to begin this ministry and take an active part in establishing and teaching a Bible class. The options are unlimited through the creativity and the participation of the people involved.

“

*... patience,  
dedication ...  
confidence in  
God's ability to  
work miracles*

”

You aren't in it alone. The Synod's Commission on Special Ministries maintains a Special Education Services Committee. This committee has actively worked to produce sound, biblical materials to teach the gospel to the developmentally disabled. Most of these materials are available simply for the cost of printing.

Why would a Lutheran school teacher, who probably has too many duties already, take on this kind of extra activity? The answer is the same for you as it is for every other Christian. It's not that

we get involved because we feel guilty; that is serving our own bad conscience and not the kingdom of God. The real answer lies in taking the time to review again, personally, what it actually means that Christ died on the cross to pay for my sins so that now I have the certain hope of life in heaven. That is where the desire to serve comes from.

Helping the developmentally disabled isn't for everyone. It requires patience and dedication and above all else, a deep-rooted confidence in God's ability to work wonders. It requires humility that confesses "I, too, am only a clay jar filled with the grace of God." This kind of work depends on the Holy Spirit and is usually accompanied by fervent prayer. But it is rewarding work. As is usually the case in ministry, the worker often finds that he or she is the one who grows most of all.

We must, for our eternal salvation, understand and believe the message of our redemption. We must, for the eternal salvation of others, make the message of redemption understandable to them. This means we learn their language and culture, if that is what is needed to communicate. This also means we seek to understand the disabilities and the abilities of those to whom we minister. On the last day we will then all stand together and we shall know fully, even as we are fully known (1Co 13:12).

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*Pastor Geoffrey Kieta, a 1993 graduate of Wisconsin Lutheran Seminary, is currently studying Spanish at the Instituto Tecnológico y de Estudios Superiores de Monterrey in Mexico.*

# A Primer on Staff Ministry

Lawrence O. Olson

“So, you’re the campus pastor for the faculty.” That comment mystified me, until the individual explained the reasoning that lay behind it. I had recently accepted the call as the Director of the Staff Ministry Program. That must mean that I was the “minister” for the “staff,” much as the Dean of Students serves in a pastoral role for the student body. Right?

Not exactly! Of course, as a brand-new program for our synod, it should not be surprising that there would be some confusion about what staff ministry is all about. This brief article will address that confusion by answering some of the more common questions that have arisen about the staff ministry program.

## *What is “Staff Ministry”?*

Staff ministry is a form of public, representative ministry. An individual is given a call by a group of believers to carry out church work on their behalf.

## *What do staff ministers do?*

The call itself defines the particular duties and responsibilities of a specific staff minister. Current position titles include the following: Minister of Music and Education, Minister of Family and Youth, Minister of Discipleship, Director of Christian Education, Family

Minister, Director of Discipleship, Program Director, Minister of Music, Minister of Evangelism, Church Administrator, and Minister of Administration. Several congregations are currently considering the positions of Deaconess or Parish Nurse; Parish Assistant and Parish Associate are other potential position titles. In each case, the call defines and limits the specific responsibilities of the worker, and those responsibilities are based on the needs of the calling body.

## *Are staff ministers pastors or teachers?*

No. Some staff ministers, however, may initially have been trained for another form of ministry, such as teaching, and then subsequently been called into staff ministry.

In one sense, of course, any time a congregation or other calling body has more than one worker on the staff, it is a staff ministry. But we are using the phrase “staff minister” to refer to an individual who is not serving as a pastor or parochial school teacher, but instead has been called to work in association with the pastor(s), other called workers, and members in focused areas of parish ministry. While pastors are trained for the broadest scope of ministry and for theological leadership, and teachers are trained in Christian classroom education, staff ministers receive basic theo-



## STAFF MINISTRIES

Director of Christian Education  
Minister of Discipleship  
Program Director  
Minister of Music and Education  
Minister of Music  
Minister of Family and Youth  
Church Administrator  
Minister of Evangelism  
Family Minister  
Director of Discipleship  
Deaconess

logical training and practical skills to equip them to serve in other specific areas of parish ministry.

### *What kind of training is available?*

There will be three elements in the program, which is still under development: general education in the liberal arts, a religion component parallel to what teaching candidates take, and professional courses designed to equip candidates with the competencies necessary to serve as staff ministers. The professional component will include both a core of required courses and a number of electives in specialized areas such as evangelism, youth work, family ministry, administration, stewardship, parish education, and the like. In addition, an internship or a series of practica will be required.

The goal is to provide academic integrity, professional competence, and program flexibility in order to best serve the needs of our congregations and of our current and prospective staff ministers.

### *Where, and when, will the program be available?*

The staff ministry program is located at Dr. Martin Luther College in New Ulm, a city of 13,000 people in south central Minnesota. Classes will be offered during the regular semesters as well as in the summer sessions, and some courses are available through correspondence and video. There is also the potential for scheduling classes off-campus at various locations. The first new staff ministry courses will be offered in the summer of 1994, and they will be integrated into the regular curriculum during the following school year.

### *Are older students admitted?*

Yes. While traditional undergraduate students will be enrolled in a five-year baccalaureate program, with the option of also being certified in elementary education, the length of the program for older students will vary depending on the previous study and experience of each candidate. Courses in the pro-

gram will also be open to current church workers—pastors, teachers, and staff ministers—who want to broaden their ministry skills or who wish to equip themselves for a possible change in ministry.

*What kind of certification is given?*

Graduates of the program will receive certification in staff ministry, which indicates that the candidate has attained the entry-level competencies to serve as a staff minister. As in the case of pastors and teachers, certification will not be for specific skill areas.

*Is the program open to both men and women?*

Yes. There will be no difference in training, just as there is no difference in the training of male and female students for the teaching ministry. Distinctions based on gender would be determined by the congregations as they establish the responsibilities of their specific calls.

*What are the costs?*

Full-time tuition is currently \$3210, while room and board is \$1790, a total of \$5000 per year for resident students. This is the net cost after an annual subsidy of more than \$4000 from the WELS. Summer session courses are \$60 per credit, and three-credit correspondence courses are \$225 each. Dr. Martin Luther College has an excellent financial aid program, and staff ministry candidates are eligible for the same federal and state aid programs as teacher candidates.

*What is the potential for service?*

There currently are more than a dozen staff ministry positions in the congregations of the Wisconsin Synod. These positions have arisen directly out of the needs of the calling bodies, without a formal process for training or placement. While we cannot guarantee that there will be positions for everyone who prepares for service, there does seem to be a growing desire on the part of congregations to add staff ministers.

The Staff Ministry Office at Dr. Martin Luther College will maintain close contact with the District Presidents of the WELS, who are responsible for preparing lists of candidates for calling bodies, to ensure that they are aware of who is available for service as staff ministers. In addition, we will continue an ongoing effort to communicate with congregations to help them to understand the potential for increased effectiveness in ministry that staff ministers could provide for them.

For further information contact the following:

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FAX 507.354.8225

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## Vouchers

Is choice a good choice?

John R. Isch

**Y**ou know something is serious when lawyers and politicians make it complicated. The North American Free Trade Act (NAFTA) and President Clinton's plan for universal health care are two cases in point. In the world of education another case in point is the voucher plan. What was once a simple scheme to give money to parents of school-age children for them to spend on the school of their choice now has become as complex as any political issue can be. Consider the following, somewhat hypothetical, piece of legislation.

State X will provide a tuition voucher of \$500 for elementary school (PK-8) children, and a tuition voucher of \$1700 for each secondary school student. The vouchers will be given to the parents of these children and they, in turn, may designate the school, public, private, or sectarian, which can redeem that voucher. In the first two years of the plan the vouchers would be available only to parents of students who are new to the school. In the third year, all students would be

eligible for the voucher. Students from families with incomes less than 150% of the federal poverty level would receive, on a sliding scale, a larger voucher. Also, students diagnosed as handicapped or learning disabled would receive larger vouchers, as determined by their level of handicap or disability. The school which redeems the voucher must charge a tuition of no less than the value of the voucher. If the school's tuition is

more than 150% of the voucher, it must set aside 25% of its voucher income for scholarships to students who cannot afford that tuition. All schools accepting the voucher must comply with the provisions of Title VI of the 1964 Civil Rights Act, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Age Discrimination Act of 1975<sup>1</sup>. Schools eligible for the voucher plan must have a minimum enrollment of 25.

In addition, all schools participating would have to provide a full disclosure to parents so parents can make an informed choice. Such disclosure would include a financial balance sheet for the school, the philosophy or goals of the school, the academic achievement of the students as measured by standardized or other readily understood measures, the qualifica-



tions of the staff, and any special programs or activities provided by the school. No voucher money could be used for capital expenses; these moneys would have to be raised by private donations (for non-public schools) or through bond elections (for public schools). Teachers would not have to be state-certified and the state would impose no additional restrictions or regulations on teacher hiring policies or curriculum requirements.

The legislation (or referendum) described above is imaginary, but it contains the typical provisions which are being discussed around the country. The voucher amount is based on current tuition charges in Minnesota; the elementary school voucher is five-sixths of the average tuition charges in non-public schools and the secondary school voucher amount is one-half the average tuition charges of non-public secondary schools in Minnesota. The two-year restriction to new students is designed to encourage the "choice" concept which is a key argument of the proponents. The reasoning is that a voucher plan is justified only if choice increases over current levels. Limiting vouchers to new students in the first two years will increase the likelihood of choice. The sliding scales for low-income, handicapped, and learning disabled students are to provide an incentive for schools to seek out and enroll these students. Otherwise, the concern is that these students will remain in public education while private education skims off those easier to educate. The provision for setting aside scholarship money for students from low-

income families is also to help those students who might otherwise be unable to afford the tuition charges over and above the voucher amount. A scholarship system would put low-income students on a par with other students in their ability to afford education. The compliance with the four federal statutes is part of the current requirements for public schools (but not necessarily for non-public schools) and they are now to be applied to all schools. Finally, the minimum school size is designed to eliminate home schools from participation<sup>2</sup>.

As you can see, things have become more complicated. An unusual mixture of church groups (United States Catholic Conference), economists (Lieberman 1989), political conservatives (Brookings Institution, Chubb and Moe 1990), traditional democrats (Daniel Patrick Moynihan), and miscellaneous organizations (Citizens for Educational Freedom, Citizens League) appear interested in one voucher brand or another. It is better to anticipate and plan for what governments will do rather than just react when they have acted. On that assumption, you are invited to share this speculation: a) How likely is a voucher plan? b) What will it do to public education? c) What will it do to non-public education, specifically, WELS elementary and secondary education?

How likely is a voucher plan?

When voters, as part of a state-wide referendum, have been asked to vote on aid to non-public or sectarian

schools, they have nearly unanimously voted it down (Doerr and Menendez 1992). Between 1966 and 1993 there have been at least 20 referenda presented to state voters, the latest in Colorado and California. Nineteen of those referenda have failed, most by substantial margins. The only victory was a relatively low-cost, low-impact, indirect aid of textbook loans to non-public schools in South Dakota in 1986. Thus, opponents of aid to sectarian schools claim that when people have the say directly, as opposed to laws passed by legislatures, they say, "No!" Laws, however, are passed by legislatures, for the most part, not by direct vote of the people. And it appears that legislatures are moving closer to some kind of voucher plan. Eleven states, including Minnesota, Nebraska, Michigan, and California, have comprehensive choice plans for public school students within or among school districts. This means that students can move between public schools or public school districts without paying tuition. Eight states, including Wisconsin have a more limited version of public school choice plans. Six states, including California and Minnesota, have charter school laws which allow parents to establish a school and receive state aid; in effect, they can establish a private school and receive public money. Most readers are also aware of the Milwaukee Parental Choice plan, begun by the state legislature in 1990 and upheld by the Wisconsin State Supreme Court in 1992. Puerto Rico declined statehood last fall, but they did pass a \$1500 voucher plan for public or private

schools. Governors Thompson of Wisconsin and Engler of Michigan are on the board of directors for the Chicago-based Americans for School Choice, a national group promoting ballot drives and other grassroots political action. The opponents of vouchers, mostly the public school establishment, appear in disarray. Somewhere, probably in the Midwest, the odds are that a state will enact a voucher plan which includes non-public schools.

Will it survive the inevitable constitutional challenge? Since 1971 (*Lemon v. Kurtzman*) the Supreme Court has used a three-fold test to determine the constitutionality of government involvement in religion: (1) The law must have a secular legislative purpose, (2) it must neither advance nor inhibit religion as a primary effect of the law, and (3) it must avoid excessive entanglement between church and state. A voucher law which included sectarian schools would probably fall on at least two of those criteria. However, the *Lemon* guidelines have been declared dead by constitutional experts for the past ten years and the Supreme Court does seem uncertain in its application of those criteria. A June 1993 decision (*Zobrest v. Catalina Foothills School District*) allowed the expenditure of public funds for sign language interpreters in a Catholic high school. The court allowed this because they saw the sign language interpreter as part of a social welfare program which was also a personal decision of the parents. Some have seen this ruling as a logical predecessor to a favorable future ruling on vouchers. However, particularly these

last two years, betting on what the Supreme Court will do in church and state issues is a very risky thing.

It appears likely that some state (rather than the federal government with the current administration) will enact a voucher plan, but all bets are off until the Supreme Court rules on its constitutionality. In point of fact, a judicial ruling may come before a legislative vote. A group of families in Milwaukee, supported by the Missouri-based Landmark Legal Foundation, has filed a suit to force the state of Wisconsin to include religious schools in the Milwaukee Parental Choice program.

What impact will vouchers have on public schools?

Most public school educators predict that vouchers will “destroy public education” (Geiger 1993; Honig 1992). On the other hand, some observers (Chubb and Moe 1990) believe that vouchers are the only way to revitalize public education. The two sides aren’t communicating well with each other any longer and the truth may lie somewhere in between. A recent study by the Humphrey Institute of the University of Minnesota (Hoenack 1993) suggested very modest effects on public education. Hoenack estimated that a voucher plan in Minnesota would reduce enrollment in public elementary schools by 2% and in public secondary schools by 10%. These rather small declines would mean a reduction in state moneys for public schools, but that funding reduction would be offset by lower costs because of fewer stu-

dents. Hoenack estimated that the cost to taxpayers would also be a wash because funding to non-public schools would be offset by reductions in funding to public schools. Others have suggested that tax dollars for education would remain the same under a voucher plan if the number of students in non-public schools would double (from the current 12%) to between 25% and 30% of the school population.

In other words, according to these projections, your taxes would not increase with a voucher plan and public schools would still enroll three out of four students. The mathematical model which Hoenack used is very complex and depends on a number of assumptions. He approached the question from an economist’s perspective of supply and demand. Although he used current data from Minnesota’s public and non-public schools, he also recognized the tentativeness of his conclusions.

Many observers would agree, however, that public schools will continue to enroll most children even with a choice plan, particularly in states like Minnesota with good public schools. Most also agree that additional private (religious and non-religious) schools will be started with vouchers. The concern that many have, therefore, is not the demise of the tax-supported, citizen-operated public school. Rather, the concern is the disappearance of the common school, the school wherein children and adolescents of varying ethnic and social backgrounds are educated together, the great vision Horace Mann had in the last century.

The demise or change in public edu-

cation is a troublesome issue for Christian educators. On the one hand, we deplore and strenuously object to some of the values, attitudes, and content taught in public education. We also protest methods such as value clarification. We have long held that there is no neutrality in education (Klatt 1972): a school either teaches the values found in Scripture or it teaches someone else's values. On the other hand, we recognize the legitimate place the government has in God's ruling of this world. The government does have the right and the responsibility to educate its people in civic righteousness and to compel obedience to that righteousness. For over 100 years Christians have affirmed and supported that right through the taxes they pay and through their participation in the democratic processes that operate public schools. Our country and our citizenship would be the poorer if public schools and their civic function were lost in a plethora of multi-focused, separatistic, private schools. We all have a stake in public education, and to dismiss their future in a voucher plan with a casual survival-of-the-fittest shrug of the shoulders would be irresponsible.

In sum, public education would be hurt, perhaps not mortally, but it may survive in a form quite unlike what it is today.

What impact will vouchers have on religious schools?

This is the critical question. Whatever concerns there are for public education, readers of this journal have a

keen and deep interest in Christian schools.

First, this author believes our elementary and secondary school system would survive. Religious schools survive in countries which provide public funds for religious schools. In fact, the Catholic church has lobbied the hardest for a voucher plan and it claims that religious education will thrive under a voucher plan. In any case, the commitment to Christian education among the congregations of our Synod is based on the Word of Life which these schools provide, not on who pays the bill. Thus our schools would survive, changed perhaps as discussed below, but survive they would as long as our members are committed to what is in those schools more than what is on a balance sheet.

Second, it would not appear that our schools and congregations would be faced with a moral issue if some state passed a voucher plan and made it available to our schools. Certainly individual members may view such a situation with great alarm and even be conscience-bound to refuse the offered voucher. But in its official documents and reports, the Synod has never categorically rejected the concept of government aid. The most extensive statement was made by the Advisory Committee on Education and the Supplemental Statement of the Board of Education (Advisory Committee 1967) nearly 30 years ago. This committee's report and cautionary statements were endorsed by the Synod Convention as "based on Scripture." Fehlauer, in an article summarizing this report, stated, "... the statements ... do not condemn

government aid as Scripturally wrong, nor do they give blanket approval to the use of government aid to our schools. They merely define and caution” (Fehlauer 1967,1). The Committee and Fehlauer issued a strong warning that individuals and congregations should judge the impact any government aid would make and base their decision to accept or reject on that exercise of Christian judgment<sup>3</sup>.

Such Christian judgment presumably has been used for the past 30 years when congregations accepted government aid for transportation, library books, lunch and milk programs, secular textbooks and other teaching supplies, remedial testing and teaching services, speech therapy, and, most recently, sign interpreters for hearing-impaired students.

Presumably also, boards of control of our post-secondary schools used the same considered judgment when they accepted the largest voucher plan of all—state and federal aid to students who attend college. Of the more than eight billion dollars (1988) of federal aid to education, 93% goes to students. Students apply these “vouchers” to any post-secondary institution: public-private, religious-non-religious. The only exceptions in the Higher Education Act of 1965 are divinity schools and theological seminaries. The GI Bill of Rights following World War II was also a voucher plan used by a number of students at our institutions.

The above is not intended to make a case for a voucher plan. The intent is to point out that a decision on vouchers will be a difficult one. If there were a

clear scriptural prohibition against vouchers or any other type of government assistance to our religious activities, we could stop at this point, refuse to accept what is offered, and endure the consequences. Instead, we must do what the second resolution of the Synod Convention of 1967 said, “be alert and concerned.”

To do that, we need to anticipate what a voucher plan might do. We will use Wisconsin as an example. Let us imagine the legislature has just passed a bill similar to the one described at the beginning of this article. In addition to a collective painful sigh by 171 principals of our Lutheran elementary and secondary schools at the prospect of filling out more forms, what else would happen?

According to the 1993 school report, there are 162 WELS elementary schools in Wisconsin enrolling 18,489 students in grades K-8. One-fourth of these schools currently charge tuition of their members. The amount of tuition to congregation members, on average, is nearly \$300. The cost per child, as estimated by the principal completing the report, is \$1120.

The voucher provided by the state in our opening scenario is \$500 for elementary school students. This is more than the average member tuition charge of the schools which do charge tuition, and the voucher is considerably less than the per pupil cost<sup>4</sup>.

There are nine area Lutheran high schools in Wisconsin enrolling 3443 students (1993). All these high schools charge tuition. The average tuition charge for the first child belonging to



an association congregation is about \$2000. Tuition contributes 55% of the operating costs of these high schools (collectively). The voucher for secondary schools in our little scenario is \$1700, less than the average tuition and less than the actual cost. Obviously, these area Lutheran high schools would have to continue to charge tuition of parents or increase their other sources of funding.

So, Wisconsin now passes its law. According to Hoenack's study (1993), enrollment goes up by 15% in elementary schools and 140% in secondary schools<sup>5</sup>. That is 2773 new students in the elementary school and a whopping 4820 new students in secondary schools. Obviously, many schools do not have the facilities to accommodate such enrollment increases and they may have difficulty raising the money for new facilities. It is likely that many non-public schools would have smaller enrollment increases simply because they have no room and they are unwilling or unable to expand. However, if these students could be enrolled, after three years the financial windfall would be impressive: \$10,630,000 for elementary schools and \$14,047,100 for secondary schools. Perhaps this is small change for the government, but it is not for us.

The reader should now begin to understand that vouchers are not just a simple matter of cashing some government checks. There is a set of decisions, many of which are difficult, which have to be made even after a personal decision favoring or opposing vouchers. Many of the decisions will be based on

what congregations and individuals believe will be the short- and long-term effects on the Christian school. "What kind of school will we have when 45% of the operating expenses comes from public funds?"

There are no sure answers to that most important of all questions. As we noted above, there are factors in starting and operating a Christian school which have nothing to do with money. There are reasons for Christian education which exist whether we are buried in gold or in ashes. If money is the only consideration we have for deciding on a voucher plan, we have already—in our hearts—lost our schools.

But knowledge regarding the other factors is uncertain. Perhaps some history can help. Nearly all western-style democracies have some kind of public aid to private and religious schools. The school system in Great Britain, for example, is confusing to an outsider, but denominational schools co-exist quite comfortably with what we would call public schools—and both are fed by the same tax-dollar. Most of these countries have had such arrangements for scores or hundreds of years. However, there is an exception.

British Columbia had no public aid for non-public schools until 1978. In that year the provincial assembly voted to provide public financing of up to 30% of the costs for private and religious schools in the province. An American researcher, Donald Erickson (1982, 1986) saw this as an opportunity to study the effects of public aid on non-public schools. Before the law went into effect he surveyed the non-public

schools and the attitudes of parents, students, and teachers toward their schools. In 1980, two years after the law went into effect, he returned and repeated his study.

The private schools in British Columbia were in dire straits before public money became available; buildings were often inadequate, teachers were woefully underpaid, and teachers and parents feared closures. Yet, Erickson concluded from his interviews:

When there are barely enough people to keep the school running, apparently they value each other's contributions very highly and express appreciation often and intensely, thus reinforcing commitment. Similarly, when a private school is short of money, it appears that people pull together as a result. Teachers, viewing the financial sacrifices of parents and the conscientiousness of students, redouble their efforts. Students, knowing that their parents are doing without things to send them to school and seeing that their teachers work extra hard for ridiculously little pay, felt obliged to apply themselves to their work. Parents, noting that teachers do so much for so little and observing that their children apply themselves, are reinforced in their commitment (Erickson 1982, 407).

Two years later Erickson found that the attitudes and commitment of parents toward the school had declined markedly. Teacher morale had improved somewhat because their salaries and job security had increased.

Teachers, however, found themselves torn between two masters, the province and the parents, and they had begun to pay more heed to the government than to the parents. The new regulations imposed by the government were rather mild—minimum time allotments for certain subjects and a mandated 12th grade test—but they did serve notice to the teachers and the schools that they were expected to meet certain standards or lose funding. Interestingly, the students reported being more engaged in their schoolwork in 1980 than they were in 1978. Erickson concludes in words our readers should understand:

One way of summarizing all these possible tendencies is to state that, in the wake of the introduction of provincial assistance, the typical British Columbia private school is ceasing to be a *Gemeinschaft*—a close-knit community in which people perform because of mutual commitment to special goals and to each other. This school is instead moving ever closer to the *Gesellschaft*—the complex 'society' where relationships among people are segmented and specialized, where goals are divergent, and where people make their various contributions calculatively, in exchange for their own special incentives—teachers for salaries, parents for religious training or a more orderly school environment for their children, and children because they have little choice. (Erickson 1982, 417)

The British Columbia experience has

a fundamental difference with proposed voucher plans in the United States. In British Columbia the money is paid directly to the school. In the U.S. the voucher plan would have the money flow through the parents so that they always have a choice as to which school to support, and to avoid the constitutional issue of public money going to a religious organization. In fact, it is this concept of parental choice which has enabled the coalition of those favoring voucher plans to include persons who have no interest or stake in religious education. These persons want to empower parents, particularly parents who historically have had little power in American society: the minorities and the poor. If this empowerment also benefits religious schools, that is acceptable, but empowerment is the key. Nevertheless, despite the lack of choice in British Columbia, there are indications that vouchers can have negative effects on peoples' attitudes toward non-public schools.

### Conclusions

This analysis of the possible effects of a voucher plan suggests the following observations and attendant issues.

Enrollments in our schools, particularly in secondary schools, will increase. These enrollment increases would be a mixture of WELS and non-WELS (churched and unchurched) students. Our schools may become more available to non-members when the substantial tuition charges our schools typically have for these students are decreased through a voucher. Schools will have to

reexamine their admission policies and the effects of a more diverse student body on the spiritual and academic goals of the school.

The financial crunch faced by many of our schools would be alleviated, at least temporarily. Teachers' salaries would likely increase and some facility expansion would be necessary. The percentage of a congregation's budget which supports the Christian school would decline. This would perhaps free these moneys for other purposes. Both the congregation and the school would have to do careful budgeting to use the additional moneys wisely.

Government regulation of our schools would increase. This seems inevitable, and some would claim such regulation will increase regardless of whether a voucher plan is enacted<sup>5</sup>. No one can predict what new regulations will result, but it is certain that there will be more. The question then needs to be answered regarding the extent to which these regulations restrict our mission.

The nature of our schools will change. This is more speculative, but as the funding shifts more to the government and parents, those who are neither may find themselves with less interest or commitment to the Christian school. The British Columbia case indicated that the parents lost control of the school, but if they retain the choice via the voucher (as with the U.S.), they may gain a greater say in the operation of the school. Our schools may become more similar to parent associations in the manner of the Dutch Reformed schools. Such a change would require

considerable rethinking of our current procedures in governing our schools and calling teachers.

Better than 90% of the money spent on a school goes for the salaries of teachers. Our teachers may find themselves with multiple and perhaps conflicting demands—as did the teachers in British Columbia. Suppose, for example, a state mandated Outcome Based Education for its schools, as Minnesota has done. What difficulties would a teacher in our schools have if her personal view or her congregation's view, or the views of the parents differed from what the state desires?

Our country's school system would be quite different. There would no longer be one large, citizen-run and citizen-paid school system. (Nor, incidentally, would there be one big, convenient target to criticize for all our country's ailments.) Something common to millions of Americans, PS 85, would be history. Americans would have to find other glue, besides *Wheel of Fortune*, for their cultural commonness.

Choice is a wonderful thing for Americans. We want a Ford or a Chevrolet, vanilla or chocolate, Mahler or the Motley Crue. Choice is democratic. However, in the case of education—public or non-public—choice may be a very bad choice.

#### NOTES

<sup>1</sup>Title VI of the Civil Rights Acts protects students against discrimination on the basis of race, color, or national origin; this legislation is currently

followed by non-public schools. Title IX of the Education Amendments of 1972 protects the rights of women and girls in educational programs or activities; non-public schools may or may not be in compliance with this statute. Section 504 of the Rehabilitation Act of 1973 prohibits schools from discriminating against disabled persons; non-public schools may not be currently in compliance with this statute. The Age Discrimination Act of 1975 prohibits discrimination on the basis of age; non-public schools may or may not be in compliance with this statute.

<sup>2</sup>Some types of voucher plans include home schools in their provisions. There is a political difficulty however because some fear that unscrupulous parents or others will take the voucher and fail to educate the child.

<sup>3</sup>For synodical or semi-official reactions to government aid see the following: Conference of Presidents, "Statement re Federal Aid to Church-related Schools," *Book of Reports and Memorials*, 1963; Board for Parish Education, "Twenty Questions and Answers on Government Aid." Milwaukee: BPE, n.d.; Board for Parish Education, "Tuition Grants for Children in Church-related Schools." Unpublished essay, 1971; Committee on Grants. "Report of the Committee on Grants." *Book of Reports and Memorials*, 1978 Convention of the WELS.

<sup>4</sup>The state is unlikely to provide a voucher equal to per pupil costs. There are some recent developments where public school districts

(Baltimore) have contracted with private, for-profit corporations to operate schools or school districts. In these cases, the contract payment has been the per-pupil cost. But discussions and proposals for voucher plans have always assumed there will be three sources of funds for non-public schools: government vouchers, additional tuition paid by parents, and foundation-benefactor-congregational support. Those who are urging the voucher plan do not propose that the government float the entire bill—yet.

<sup>5</sup>Note that the reduction in public school enrollment is small, but because the non-public schools enroll fewer students, their percentage increases are much greater.

<sup>6</sup>There is potential for considerable fraud in any voucher plan and taxpayers will demand accountability and oversight regarding who receives these public funds. When large amounts of money become available, people enter the system with different motives. The Pell Grants (federal funds for college students) spawned a number of abuses by proprietary and technical schools, which resulted in more government regulations.

#### WORKS CITED

Advisory Committee. "Governmental Aid to Education," *The Lutheran Educator* 8 (1967): 13-20.

Chubb, John E. and Terry M. Moe. *Politics, Markets, and America's Schools*. Washington, D.C.: The Brookings Institution, 1990.

Erickson, Donald. "Disturbing Evidence About the 'One Best System.'" In *The*

*Public School Monopoly: A Critical Analysis of Education and the State in American Society*, edited by Robert Everhard. San Francisco: Pacific Studies in Public Policy, 1982.

\_\_\_\_\_. "Choice and Private Schools: Dynamics of Supply and Demand." In *Private Education: Studies in Choice and Public Policy*, edited by Daniel Levy. New York: Oxford, 1986.

Fehlauer, Adolph. "Shall My School Participate?" *The Lutheran Educator* 8 (1967): 21.

Geiger, Keith. "Change and the Public Schools." *Education Week* 17 November 1993, 28.

Lieberman, Myron. *Privatization and Educational Choice*. New York: St. Martin's Press, 1989.

Doerr, Edd and Albert Menendez. "The People Say No! The Parochial Referenda, 1966-1990." In *Why We Still Need Public Schools: Church/state Relations and Visions of Democracy*, edited by Art Must, Jr. Buffalo, NY: Prometheus Books, 1992.

Hoenack, Stephen A. "An Econometric Study of Alternative Designs of an Educational Voucher System in Minnesota." Unpublished paper presented at the "School Choice in Minnesota" conference, 11/16/93.

Honig, Bill. "Why Privatizing Public Education is a Bad Idea." In *Why We Still Need Public Schools: Church/state Relations and Visions of Democracy*, edited by Art Must, Jr. Buffalo, NY: Prometheus Books, 1992.

Klatt, H.R. "An Appraisal of Educational Principles in the Light of Scripture, Revised." Milwaukee: Board for Parish Education, WELS, 1972.

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# Authentic Assessment: Mathematics

David J. Pelzl

**I**n a previous article, authentic assessment was defined and explained; this article will focus on the application of authentic assessment in mathematics. To repeat from the previous article, authentic assessment “is assessing a student’s performance in a context more like that encountered in real life...assessment is based on the daily work of students” (Wendler 1993, 52). Standard 6 of the Professional Standards for Teaching Mathematics developed by the National Council of Teachers of Mathematics states, “The teacher of mathematics should engage in on-going analysis of teaching and learning by observing, listening to, and gathering other information about students to assess what they are learning” (1991,62); the purpose of this is to make improvements in teaching, changing short- and long-range plans, and in general affecting the child’s learning in a positive way. Authentic assessment in mathematics has been a reaction to traditional mathematics assessment procedures that test a limited set of procedural skills.

What are the types of authentic assessment that can be used in the mathematics class? There are a number that will be explained in this article. Many of the types which will be

described are intended to illustrate student growth in the areas of problem solving, reasoning, communication, and connecting learning to other subjects or the real world. Most of these types of authentic assessment can also be used in other classes by the skillful teacher.

## Performance assessment

The first type of authentic assessment is performance assessment. The teacher provides students with mathematical tasks that consist of projects, investigations, or longer problems, and then observes, discusses, and evaluates the final product. These activities are more creative in nature than the ordinary exercises in a mathematics text, they may take as little as 30 minutes or more than a day to complete, and the students have the opportunity to display more of their ability. Assessment is often informal in the early stages of the investigation, and teachers using the method will generally have a clipboard on which they jot comments about how various students are performing the task. Sometimes teachers will have a check list of concepts that the student is to learn while working on the task, and they will then note the student’s success on the check list. Some teachers use preprinted name labels and they place the labels under the concepts as the stu-

dents show their knowledge. Performance assessment can usually be identified by observing the active involvement of the students. Students may be working in groups or individually, and often the tasks have more than one correct answer. Performance assessment begins with a task, includes some response by the student, an interpretation of the response by the teacher, an evaluation of the response as compared to others received, and finally some written response by the teacher. This response may vary from a written remark of "well-done" for the project to a specific grade.

#### Demonstration

Another type of performance assessment might involve requiring a student to demonstrate his/her knowledge before the teacher or before the entire class. If the demonstration is to be done before the entire class, the teacher needs to be sure that the student is not put under pressure before the class and that the student's knowledge is not masked by the situation. For those reasons, the student demonstration is often done individually, or as part of a small group, in response to the teacher's request. Some examples of a student demonstration might be these:

"In front of you are quite a number of pattern blocks. I want you to place them side-by-side in a snap, clap, clap pattern." (primary grade example)

"What is the length of this room?" (intermediate grade example: Note that the student also has to decide on what tool to use for the measuring.)

"Use these cubes to find the volume of this shoe box." (upper grade example)

In all these examples, the student will be actively involved in the work, which is close to real-life encounters, and the teacher will be assessing the understanding that the student has.



#### Open-ended question/interview

A very simple type of performance assessment could be an open-ended question such as, "Explain how you arrived at your answer and include a drawing of what you did." Problem solving is a lucrative field for performance assessment, but the key is that the teacher must select good individual problems. If grading is done of such performance assessment, simple right or wrong marking is not appropriate. Usually the teacher will assess how the student understood the problem, how

the student developed a plan for solving the problem, and how the student actually solved the problem.

Whether the performance assessment just described or the student interview (see below) is used, there is one common goal, namely to understand how the student is thinking about mathematics. Interviews are a rich source of that information and serve as another example of authentic assessment.

“How did you solve this problem?”

“Did anyone solve this a different way?”

“If you were to explain that to someone who did not know, how would you do it?”

The questions above are examples of authentic assessment that can be used in a whole class situation where the goal is to understand how the student was thinking about mathematics. Offering students the opportunity to explain a strategy used to solve a problem opens the door to learning. A teacher who encourages such responses not only has an active thinking group of students, but will also have ample opportunities for authentic assessment. Such opportunities do not just happen; the teacher needs to plan for them, which often requires a good choice of problems. Many teachers unconsciously are interviewing students in a whole class situation, but they are not taking the opportunity to assess them at the same time.

A more specialized interview, sometimes called the clinical interview, can be used effectively to try to understand children’s thinking. Piaget was one of

the first educational psychologists to study how children learn, and he could be considered the originator of this technique. The teacher, as interviewer, attempts to have the student “think out loud” about what he or she is doing in mathematics. While such an interview can be done in a whole class setting, most often it is a one-on-one interview, with some recording of results, usually using a tape recorder or video camera. The teacher begins with simple, non-threatening questions, and then proceeds to the more difficult questions that require the student to explain his or her thinking. This is often carried out while the rest of the class is working on some other assignment. The purpose of the interview is to be able to use the knowledge gained to make improvements in the learning process for the entire class. Thus during the clinical interview, children are not corrected if their thinking is in error. Rather, the teacher makes a concerted effort to find out why the student is making the error(s). If the student really does understand the concepts involved, the teacher receives feedback that becomes part of the assessment of that student. Some teachers use the clinical interview on a daily basis, with the intention to interview each child at least once a week, or in large class situations, once every two or three weeks. Used daily, the teacher is getting immediate feedback on how the student understands the concepts that were recently learned; and if several children are interviewed in the same day, the teacher will know whether the most recently taught lesson achieved its goal.



The clinical interview has been used in the mathematics methods course at DMLC the past several years with pre-service teachers, and those who have participated have found the experience very revealing about how students think about mathematics. The teacher in the classroom has the added advantage of already knowing his or her students very well, and can use that knowledge to make the interview a learning experience.

#### Journals

Another type of authentic assessment is the learning log or journal. In the journal, the students write about mathematics, revealing personal feelings about the mathematics they are doing. Like the critical interview, the information contained in the journal informs the teacher how the student thinks about mathematics. When used regularly, journals can help the teacher make decisions about whether more time needs to be spent on certain concepts. Some teachers use the journal on a daily basis as a part of every mathematics assignment, having the children reflect on what they learned that day or on one particular problem. This use gives children the opportunity for self-assessment. Reading such journals can take time, but teachers who use them regularly indicate that the time is well spent for all the information that is revealed about the mathematical thinking occurring in the classroom.

Another type of authentic assessment is the portfolio which can also be used effectively in mathematics. This assess-

ment will be discussed in a future article in the *Educator*.

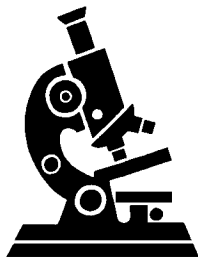
There are some excellent resources for authentic assessment in mathematics. Jean Stenmark (1989) has written a brief introduction to assessment. She has also edited (1991) a 63 page paperback which contains useful and practical suggestions for assessment. The 1993 yearbook of the NCTM (Webb 1993) describes well the changing role of assessment today. A new resource, *Assessment Standards for School Mathematics*, is to be published in the summer of 1994. This would appear to be more comprehensive than previous attempts to describe assessment.

#### WORKS CITED

- National Council of Teachers of Mathematics. *Professional Standards for Teaching Mathematics*. Reston, Virginia: National Council of Teachers in Mathematics, 1991.
- Stenmark, Jean K. *Assessment Alternatives in Mathematics*. Berkeley, California: University of California, 1989.
- Stenmark, Jean K. (ed.) *Mathematics Assessment: Myths, Models, Good Questions, and Practical Suggestions*. Reston, Virginia: National Council of Teachers of Mathematics, 1991.
- Webb, Norman (ed.) *Assessment in the Mathematics Classroom*. Reston, Virginia: The National Council of Teachers of Mathematics, 1993.
- Wendler, David. "Authentic Assessment." *The Lutheran Educator* 34 (December 1993): 51-54.

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## The Use of Historical Vignettes in Teaching Science

Steven R. Thiesfeldt

as a record of man's successes. Think of the modern advancements we enjoy in the fields of medicine, transportation, and personal comfort. We've come a long way from the day when people lived in fear of diseases like polio, when the horse was considered a fast method of transportation, and warming one's self by a fire was the best that could be accomplished during the depths of winter. A study of the history of science quickly reminds us that those things which we now take for granted were not always the norm. It emphasized the processes of science, not just the products of human endeavors (Roach and Wandersee 1993). More importantly, it reveals the fallibility and finite wisdom of man in contrast to the infallibility and infinite wisdom of God.

One way to incorporate the historical aspect of science is through the use of historical vignettes. A vignette is any small, pleasing picture or a small, graceful literary sketch; literally interpreted, the word means a little vine or branch. Think of a historical vignette as an excerpt which creates interest in the topic at hand, not by telling the entire story, but by highlighting little branches that whet the appetite to know more. Vignettes can help students make connections between themselves and the scientists that appear in their textbooks (Roach and Wandersee 1993). A few examples follow.

**W**hat physical handicaps did John Dalton overcome in becoming a renowned scientist? Why did Gabriel Fahrenheit choose thirty-two degrees as the freezing point for water? Which animals were the first aerial passengers over 200 years ago? What was the ancient philosopher Democritus' viewpoint of matter?

There was a time early in my teaching career that the answers to questions like these seemed unimportant in the teaching of science. The memorization of science terminology and the development of related concepts already demanded more time than I could find in a busy school day, so why compound the problem by concentrating on ancient history? Why not concentrate on where man finds himself today in the scientific world? What value could the study of the past possibly hold for the science of the present? Fortunately, a more experienced teacher changed my thinking and now the history of science plays a prominent role in my science classes.

There is a tendency to look at science

John Dalton left school at age eleven and within a year was teaching at a Quaker school. While he failed at teaching—some of his students were as old as he was and presented disciplinary problems—his interest in science was born. During a time when public speaking was the rage, Dalton was a poor speaker and could not make money as a lecturer. Finally, color-blindness contributed to his reputation as a clumsy and slipshod experimenter. In spite of these failures and handicaps, Dalton is remembered for developing the first atomic theory supported by scientific evidence (Asimov 1982, 259).

The topic of atomic theory brings to mind the ancient Greek philosopher, Democritus. His view of the atom, through remarkably accurate by today's standards, was purely philosophical. Democritus theorized that atoms had physical differences which explained the various properties of the substance; he applied this idea to the "elements" of his day—earth, air, fire, and water. The atoms of water were smooth and round so that water flowed and had no permanent shape. The atoms of fire were thorny, which was what made burns so painful. The atoms of earth were rough and jagged, fitting together like the pieces of a puzzle to form a solid, stable substance (Asimov 1982, 12).

Most people realize that animals were sent into space during the 1950s as a prelude to manned exploration of man's final frontier. Few people realize, however, that on September 15, 1783, Etienne Montgolfier sent a magnificently decorated hot air balloon into the French atmosphere above the Palace of Versailles with the first aerial passengers—a rooster, a duck, and

a sheep. When the balloon landed, the first to reach the scene was the chemist, Pilatre de Rosier. Seeing that the animals were safe, he resolved to be the first man in space—and later died in a tragic ballooning accident (Davenport 1983).

Modern man is intrigued by scientific instrumentation but often overlooks the sophisticated development of some very simple instruments. Gabriel Fahrenheit used his business in the manufacture of meteorological instruments as a springboard to the development of the mercury thermometer. By the eighteenth century, alcohol or alcohol-water thermometers had replaced the gas thermometers of Galileo's day, but neither was very accurate for his purposes. Fahrenheit substituted mercury for alcohol and developed a new temperature scale to match the capabilities of his instrument. He added salt to water to get the lowest point he could duplicate in the laboratory and called that zero. He used his wife's body temperature as the other fixed point and divided the difference between that and zero into ninety-six "degrees." He later adjusted that slightly to make the boiling point of water equal to 212, exactly 180 above the 32 freezing point of water. On this familiar Fahrenheit scale, body temperature is 98.6 (Asimov 1982, 168).

The historical change of scientific thought must be taught. It is at least as important as the teaching of rigid definitions, classifications, formulas, and the abstractions of nature (Sponholz 1989). As the previous vignettes illustrate, neither man's knowledge nor the laws of nature are absolute. While man's knowledge

serves him well, it also pales in contrast to the complexity of the created world. No wonder our explanation of the natural world is becoming more and more complex! Anyone who has ever attempted to teach atomic theory can attest to the challenge it brings. What better way to teach this aspect of science than to go from the simple to the complex through the vehicle of history!

Historical vignettes can be presented in a variety of ways. A teacher who has developed an effective story-telling technique can make the history of science come alive for his students. The story-telling can be enhanced through the use of slides, overhead transparencies, costumes and props, or simple demonstrations. Students can be encouraged to research the historical aspects and present reports or dramatize the stories themselves. Encyclopedias are an obvious source of information, and library-based reading lists supplied by the teacher can provide direction. One of the best resources I have seen is *Asimov's Biographical Encyclopedia of Science and Technology* by Isaac Asimov. It should be included in all school libraries. The secondary level magazine *ChemMatters* by the American Chemical Society is a quarterly publication which contains a regular emphasis on the history of science in its issues. Video cameras or multimedia tools can also serve as an excellent way to capture and share historical vignettes in an interesting manner.

History has often been called his story—God's story. As Christian teachers, we recognized the guiding hand of God in the affairs of every nation and

people that has ever existed on earth. Conveying that same philosophy to our students is a primary goal of our teaching. The use of historical vignettes in the teaching of science can bring science into the same realm. Science without history cannot reveal the true nature of science. It gives the illusion that findings in science are correct and final. Science with history shows the Christian where the laws of science have been created—in the minds of people. Science with history reinforces what we already know by faith that the natural world as created by God is in perfect harmony with his Word (Sponholz 1990).

#### WORKS CITED

- Asimov, I. *Asimov's Biographical Encyclopedia of Science and Technology*. Garden City, NY: Doubleday and Company, Inc., 1982.
- Davenport, D. "How the Right Professor Charles Went Up in the Wrong Kind of Balloon." *ChemMatters* (December, 1983): 14, 15.
- Roach, L., and Wandersee, J. "Short Story Science." *The Science Teacher* (September, 1993):18-21.
- Sponholz, M. *Separate from His Word*. New Ulm, MN: DMLC Print Shop, 1989.
- Sponholz, M. "The Old with the New: An Introduction to Separate from His Word." Paper read at the Professors' Conference at Watertown, WI, June 6, 1990.

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# STOP Borrowing!

David J. Pelzl

**Y**ou and I are probably very similar in one way: we receive a bill from the credit card company.

This form of borrowing forces us to pay back some or all when we pay the bill. Oh, but wouldn't it be nice if we could end all borrowing!

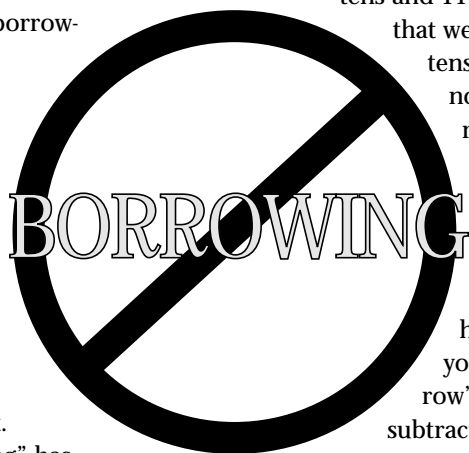
I say it's high time we eliminate one kind of borrowing from our vocabulary, and that's the "borrowing" that is taught in subtraction. What a meaningless term! When was the last time a child borrowed a ten to change it into ones in order to subtract, and then later returned the ones to the tens? How ridiculous—we never do that.

The term "borrowing" has not been used in most textbooks for a long time, yet students in my college mathematics class used the term just the other day. Why is it still in their vocabulary? It is there because teachers continue to use this outdated term. I looked at over a dozen recent elementary mathematics textbooks, and the terms used to describe the subtraction

process included renaming, regrouping, trading, or exchanging. (One exception was a textbook by the Saxon Company. It used the term borrowing, although it did suggest an alternative. I don't believe borrowing should have been used at all.) What is wrong with using terms that describe accurately what happens when 31 is rewritten as 2

tens and 11 ones? Why not say that we rename 3 tens as 2 tens and 10 ones? Why not say that 31 is regrouped, so there are now 2 tens and 11 ones. Your teacher probably taught you to "borrow," but do you have to keep teaching your children to "borrow"? Understanding the subtraction process is

important, so why not use a term that describes that process? So, I say, let's begin trading or exchanging the terms regrouping and renaming for borrowing. Let's stop borrowing!



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## First Year Thanks!

Ramona M. Czer

**D**ear New Teachers,

What a blessing you are to our school! I'm writing to thank you but also to offer a little advice, for what it's worth. Why did I wait so long? Because I know what it's like to be in a new position, to feel overwhelmed, stimulated, exhausted, and inspired all at once. I've even experienced what I call "new job amnesia" which means I'm not responsible for anything I hear in the first few days of a new job—it will probably have to be repeated. Sound familiar? I decided to wait until you might be more ready and eager to listen.

First, thank you for being energetic and sparkling with ideas. I can tell when you talk (and when you don't) that your mind is racing, with your heart close behind. Schools appreciate such zest and need it. A gentle warning here: consider sometimes masking your feelings, not letting every disappointment, every triumph flash across your face and then out of your mouth. Consider waiting to hear what others

say, to weigh all the facts before jumping in. I'm all for honesty, but your enthusiasm may be misinterpreted as egotism, or you may be saddled with an opinion you wish you could change after more information or experience. In the same vein, be careful not to tell children everything they long to know about you. Insatiable creatures, they'll pump you until they know your age, your middle name, whom you date, how often, and where you go. Not that you can't share your life, just be discriminating. They can get silly—or even manipulative—with too much information and then cross the line into cheeky disrespect.

Thank you too for all your hard work. So much of it goes unnoticed and unappreciated. I've often thought that most teachers can take any one or two of these things but not all three: being underpaid, overworked, and unappreciated. When all three are true, it's easy to become burned out and stressed out. Hence this warning: don't be afraid to pace yourself. You can serve your Savior and your school well and still have a social life. In fact, I believe workaholic teachers damage their min-

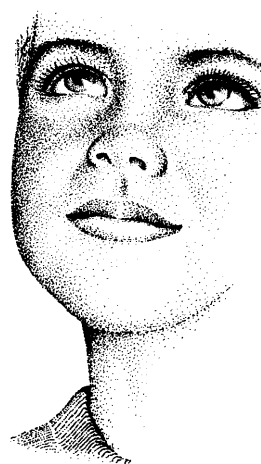
istry. It's hard for them to stay fresh and joyful. They don't hone their communication skills, a vital ability for teachers who long to understand children and the lives of the parishioners. And sometimes they don't create friendships and romantic relationships that could buoy them up in the Lord.

I also believe that some of you have had to adjust to a new standard of living. I realize that you went into the teaching ministry with your eyes open. You knew that your reward would be in heaven. You knew you'd never earn what public school teachers do, but you also knew you'd get to experience the joy of molding young hearts for Jesus in the classroom. You knew all that, and yet it's not easy doing without new clothes or perms or first-owner furniture. Thank you for the sacrifices you make so that our school can survive. We know we are lucky to have your intelligence and creativity working for us every day.

On the other hand, here is an urgent warning: don't get dragged into the habit of endlessly complaining about salaries, not with other called workers, and certainly not with parishioners. It's easy to do—misery loves company. But what happens is that you forget to be a servant. You forget to put your trust in the Lord. You forget that the congregation watches you as an example of living by God's priorities. Not that you can't request a raise, but do so humbly, not as if the congregation "owed" it to you. Also be sure you don't ask just for yourself but for all the called workers. Nothing seems to breed discontent more than inequitable remuneration.

Keep in mind too that many of your members make even less than you do and sometimes put in as many evening hours. They do it out of love for their Savior. Should you do any less? You can bet they don't get two weeks at Christmas, or one at Easter, or 5+ weeks in the summer either.

By now I'm sure you've heard the old joke, "There are three reasons Mr. Jones went into teaching: June, July and August!" Does it make you bristle a little? Wonder if behind the joking there's some resentment? Could be. If you're honest, you probably do enjoy the idea of more freedom for a fourth of the year. You enjoy the flexibility, the chance to do errands and see parades and leave for long weekends. After all, for the other three fourths you burn the midnight oil and have anything but a flexible schedule. But I caution you not to take advantage of the trust your members place in you. They expect you to be working most of June and August, perhaps not at school, but somewhere. They expect you to be eager to take



classes and workshops, read up on things on your own, do long-range planning, straighten up your classroom, and change the bulletin boards. They hope to see you at school sometimes so their pride in your diligence is confirmed. I join them in saying thank you for giving us so much of yourself and thank you for using your summers to become an even better teacher than you already are.

I could go on and on. Thank you for listening to my children's interminable stories (and for not believing them entirely!). Thank you for guiding and directing them with loving firmness. Thank you for giving up many holidays with family to sing in choir or lead the children in praise. Thank you for coaching teams far into the night so our children can experience the benefits of fitness, fellowship, and self-disci-

pline. We see your dedication and are awed by it. You are an excellent example of what it means to "seek first the kingdom of God."

Hang in there, new teachers. Sooner than you might think, you will grow in confidence and ease in your calling. You will anticipate problems, head off crises, and deal thoughtfully with surprises. As you settle in, please hold on to your youthful enthusiasm. One of your most valuable assets, it will buoy you up and inspire your colleagues as you labor together in the work of the Lord.

In deep appreciation,

A Mother

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*Ramona Czer is a wife, mother, student, and writer living in New Ulm, Minnesota.*

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