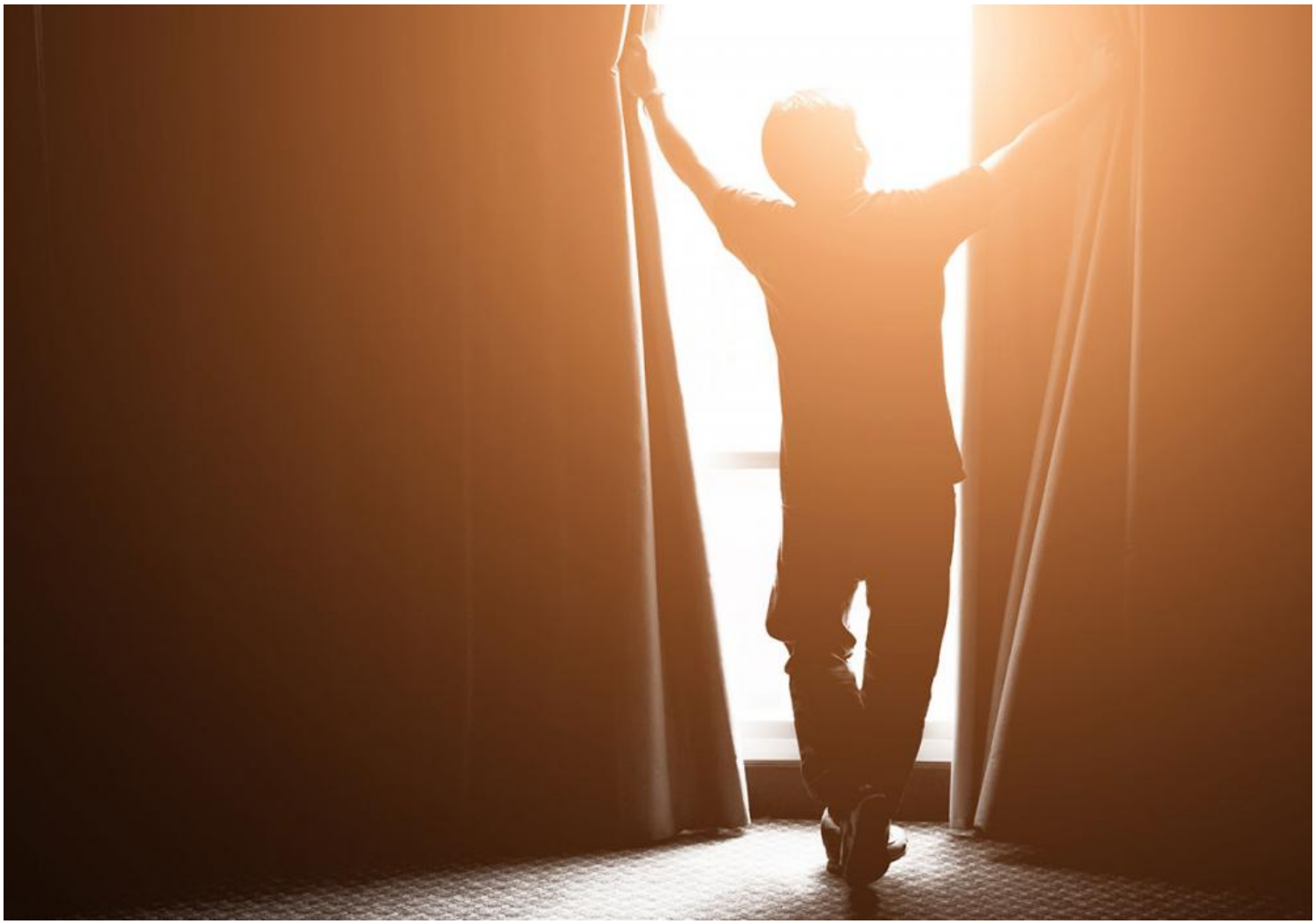

There are times in our personal and professional lives—individually and collectively–when fear seizes our hearts. We fear losing that which is of great value to us; we may feel as though we've lost all hope; or we may have a glimmer of optimism, but the storms threatening to surround us strip us of courage—leaving us disheartened, paralyzed with fear, and caught in a cycle of inertia. How can we continue to be hopeful during these difficult times?

Hope is intangible—an indescribable spark of optimism anchored deep within us. American poet Emily Dickinson, who lived her life as a recluse, is well known for her cryptic descriptions of hope. She wrote: "Hope is a strange invention—A patent of the heart—In unremitting action/Yet never wearing out—."[1] In another poem, she penned: "Hope is the thing with feathers—That perches in the soul—And sings the tunes without the words—And never stops—at all."[2] Even in her retreat from society, hope

flickered in her thoughts. Most of us do not have the luxury of withdrawing from the world, away from trouble. We have to face the ups and downs of life with the belief that we will come out of the experience with our hope intact.

Researchers and scientists believe we are created and wired, as human beings, to have hope. Some call it "optimism bias,"[3] others call it the "placebo effect."[4] What is it about hope that stirs the soul? I believe we fully grasp the meaning of the word when we look at what life would be like without it. Proverbs 13:12 says: "Hope deferred makes the heart sick, but a longing fulfilled is a tree of life."[5] Someone without hope is characterized as living in despair. *Webster's Dictionary* tells us that a hopeless situation is one that has no possibility of changing or improving. Conversely, someone with hope expresses a higher level of certainty and optimism, which inspires preparation and visioning for the future.[6]

In 2014, Cornell University, the University of Notre Dame, and the University of Pennsylvania initiated a four-year, US$5 million research grant project called *The Hope and Optimism Initiative*. Andrew Chignell and Samuel Newlands, co-primary investigators, led an interdisciplinary team of researchers from the disciplines of philosophy, philosophy of religion, and the social sciences. The initiative sought to generate conceptual, empirical, and practical understandings of hope and optimism.[7]

Chignell posed the central research question: "Can we be clearer about the different kinds of hope that people have, use, and talk about?" The researchers hypothesized that there would be a spectrum of very different kinds of hope. They found that on one end of the hope spectrum there is *facile hope*—hope that consists of the desire for something to happen and perhaps the belief that it's possible, but no attempt is made to structure one's life around the possibility (winning the lottery, for example). On the other end of the spectrum is what Chignell calls *robust hope*, where a person not only believes something to be possible and wants it to occur, but also takes decisive actions because of it.[8]

In fact, the positive physiological effects of robust hope have been well documented, most acutely by the experiences of those living with chronic and terminal illnesses. Physician Jerome Groopman in *The Anatomy of Hope* writes: "Researchers are learning that a change in mind-set has the power to alter neurochemistry."[9] He continues: "Belief and expectation—the key elements of hope—can block pain by releasing the brain's endorphins and enkephalins, mimicking the effects of morphine. In some cases, hope can also have significant effects on fundamental physiological processes such as respiration, circulation, and motor function."[10] The idea that simply being hopeful can

respiration, circulation, and motor function.[10] The idea that simply being hopeful can potentially make a difference in brain chemistry or physiological well-being might seem like a stretch, especially when considering the abstract nature of the concept. Yet, Groopman is emphatic: "True hope has no room for delusion."[11] We have to face the situation head on, and in the process, find pathways to dealing with crisis.

Shane Lopez, author of the book *Making Hope Happen,* offers another perspective and suggests: "Hopeful people conjure a vision that sustains them, that causes them to show up for the hard work and accept setbacks. They make an investment in the future that pays off in the present: in the way they eat, exercise, conserve energy, take care of themselves, stick to their treatment plans [if fighting chronic or terminal illness], or just live their lives with optimism."[12] Similar to the work done by Chignell and Newlands, and Groopman, Lopez suggests that hope in its most robust form incorporates action, preparation, planning, and visioning.

So what do we do with this abstraction? Do we leave it alone as an intangible concept, or can we truly find purpose for hope and optimism in our lives? In Jeremiah 17:7 we are told that the Lord is the hope of those who place their trust in Him, and in 1 Peter 1:3 we are reminded that God has given us a "living hope" through Jesus Christ. We have a living hope!

Several years ago, Duane Bidwell (a theologian) and Donald Batisky (a pediatric nephrologist), came together to research and write articles about children and their families coping with chronic illness. They identified five pathways to hope:

- *Maintain identity*. Keep a regular routine similar to one prior to the event.
- *Build community*. Interact with and seek out others who are experiencing a similar situation, and spend time connecting.
- *Reclaim power*. Take back power from the situation by continuing to make plans and set goals.
- *Attend to God*. Embrace spirituality through religious practices, connecting with God through prayer, meditation, and reflection.
- *Acquire wisdom*. Gather wisdom from the community, medical experts, and through sharing one's experience with others.[13]

These pathways are active, constructive, and deliberate choices, and could apply in most difficult situations. Hope is a choice—one that needs to be nurtured every day in our homes, churches, and schools. Together, as administrators, teachers, pastors, counselors, and those who serve in schools, we are called to create learning

counselors, and those who serve in schools, we are called to create learning environments that inspire hope in the lives of students, many of whom face pervasive

hopelessness and can see no way out of unresolved anger, anxiety, bullying, depression, or extreme poverty. Adventist schools must be enclaves of hope and optimism, places where both are planted, cultivated, and nurtured. We know each one has power to transform individuals and situations, and beyond that, we believe that hope in God transforms lives. Maybe this past school year was fraught with personal or professional storms and turbulence—some are more difficult than others; and, in the future, we can certainly expect to experience personal tragedies, or financial, social, or political crises. In fact, despite our best efforts, our situations might not change; in some cases, they might get worse. Yet, we can chose not to fear, for fear is the absence of hope.[14]

What do we do in troubled times? We clothe ourselves in the hope and assurance of God's presence in difficult circumstances—"'And surely I am with you always'" (Matthew 28:20); remember His working in past experiences—"I remember the days of long ago; I meditate on all your works and consider what your hands have done" (Psalm 143:5); and claim the promises of deliverance for the future—"'When you pass through the waters, I will be with you'" (Isaiah 43:2). Hope, grounded in God's promises, is a bastion against any storm. May this robust hope be ours as we navigate the days ahead, nourishing and nurturing hearts that are hopeful, expectant, and fearless.

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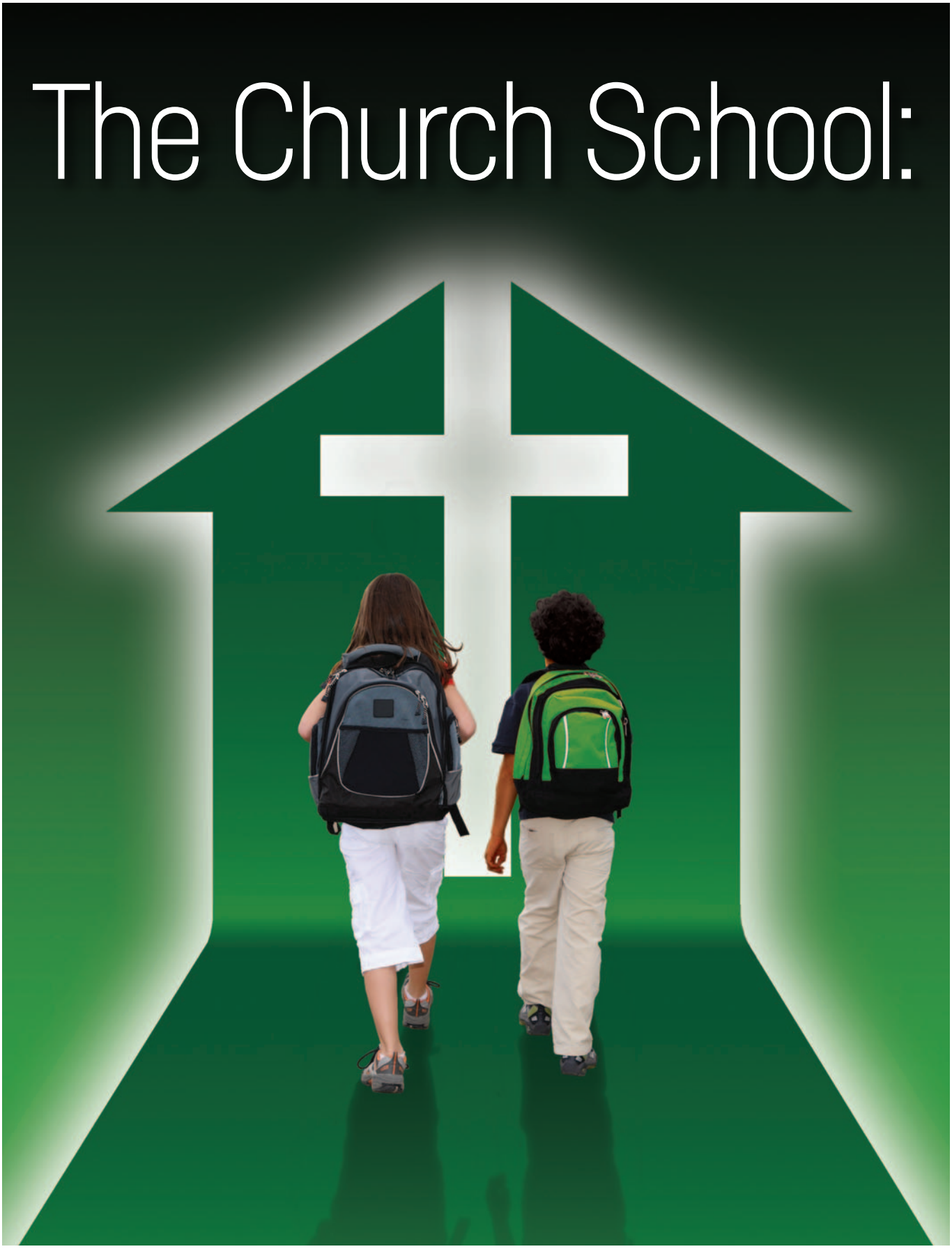
The Church School:



Where Churches and Schools Collaborate in Mission

Following is an adaptation of Dr. Jiří Moskala's presentation to attendees at the 2017 LEAD Conference held May 30-June 4, 2017, in Slovenia, which presents his vision for strengthening Adventist education and the role pastors and churches have in accomplishing this goal.

This presentation shares a vision for the revitalizing of Adventist education by proposing to do things differently. The sad reality is that 247 schools in 14 years—or 170 in seven years—of our North American Division (NAD) Adventist schools have closed.[1] When I heard this alarming statistic, I asked myself if we in the Seventh-day Adventist Theological Seminary at Andrews University (Berrien Springs, Michigan, U.S.A.) can contribute to reversing this trend. Forgive my simplification of a complex problem, but sometimes an over-generalization can help us to identify issues and help us to progress and grow. So where do the problems lie? They exist on several levels:

1. Many of our pastors did not have an opportunity to go through the excellent Adventist system of education. They either converted later in life or if they grew up in an Adventist family, their parents for some reason decided not to send them to our schools. Thus, they have not had an Adventist educational experience.[2] This fact may contribute to their feeling or even conviction that Adventist schools are not crucial for educating our children and youth.

2. Pastoral effectiveness is usually evaluated by the number of baptisms, financial growth (tithes and offerings), and preaching, but not so much by items related to our schools: their commitment to the success of the local school, being present and advising students, encouraging, playing with its children and young adults, teaching Bible classes, leading worship, participating in school board meetings, etc.

3. Many pastors and members have a limited understanding of the symbiotic relationship that should exist between churches and church schools. Conventional thinking suggests that the Adventist school operates under the supervision of the local church—whether a single church or a constituency of churches (and rightly so); therefore, in the minds of many, the church decides what will happen there. Further, when people speak about the relationship between the school and the church, the center of such symbiosis is the church. Rarely is the center of activity considered to be the school. However, while the church is open only for several hours during the week, the school operates almost all the time. Activities held by either church or school should be mutually beneficial. It is essential for church members and church administrators to understand that working together with school administrators and teachers can help the Adventist school and church achieve maximum impact in the community, reaching those who might not readily step into a church. For example, while secular people might be biased against a church, these same individuals might be more open toward an educational institution.

4. In addition, it could be that a pastor and the church board (and many members) may perceive the school as a financial burden (a school is not an industry for producing money), a time-consuming enterprise, and the business of others, namely the school principal and his or her team of teachers and staff. They may think that the school board is a subsidiary of the church board.

5. Most importantly, in terms of pastoral involvement, I realized, to my amazement, that there was no class offered in the seminary for pastors regarding the importance of Adventist education and how to facilitate collaboration between the church and the school. So we were part of the problem, but beginning fall semester 2017 we were able to rectify this situation in cooperation with the North American Division Office of Education.

BY JIŘÍ MOSKALA

We need to break through negative stereotypes. Fresh thinking and a new practice model are needed that can bring tremendous results. We all agree that the school, church, and home need to closely collaborate in order for the system to work. Without this close connectedness and a sense of togetherness, nothing will change, grow, or advance. The Valuegenesis research regarding Adventist education showed that collaboration between homes, churches, and schools increases the possibility of children and young adults both growing in faith and being committed to the Seventh-day Adventist message, lifestyle, mission, and Church.[3] The longer one is enrolled in Adventist education, the more loyal and mature one's faith generally becomes.

The Seventh-day Adventist Theological Seminary at Andrews University wants to be a center for this innovative approach to education. It is our desire to lead in the best educational practices for ministers. This proposal has the potential to revive Adventist education as well as renew a close and fruitful cooperation between the school, the home, and the church because it will enable young men and women to grow up with a deep appreciation for Adventist identity and lifestyle. They will learn to know and enjoy what it is to be Adventist. This will help stem the tide of the tragic loss of youth from the church (in excess of 60 percent)[4]; it will facilitate the development of a new era of young Adventist leadership within the church as the result of increased school and church partnerships; and schools will become powerful magnets to draw unchurched families to God *through* the Adventist school *into* the church.

This new initiative of cooperation between church, schools, and pastors is built on the following:

1. In the seminary, we have created a required course, DSRE 615 Collaborative Ministry[5] for all MDiv students (pastors) in which the beauty and importance of the Adventist philosophy of education will be taught. In close collaboration with the North American Division Office of Education, we have developed a meaningful, interactive, and relevant course to equip our pastors with the best skills for creating this new approach to our educational system. Collaboration continues with the South Pacific Division and the South American Division, and will be expanded to include other divisions as the initiative grows.

2. We would like to change the pattern of thinking about the Adventist educational system. Instead of having the church be the center of action, we think that pastors should make the school the location where different outreach activities take place in order to connect with the local community. It should be an evangelistic center functioning as a community magnet. Since the school is open with multiple interactions taking place during much of the year, it will thus result in promoting Adventist education both within the church and in the community at large.

3. The community will generally be open to Adventist schools because they provide a safe and healthy environment and excellent, high-quality education. This means that the community typically will not have biases and prejudices toward our schools, and we need to take advantage of this fact. So the school should be the center of community life and receive strong support from the local church(es). The school should be an open community—friendly and inviting, which will make it a place of gathering for the children and their parents.

4. Consequently, the school should be a center for evangelism (understood in a broader way than just holding evangelistic preaching campaigns there). For me, every activity and everything done in such a center is evangelism. Besides being an educational center for children and/or young adults, schools can hold evening classes and a variety of different activities for the community. The school can be a place for people with different interests to meet and interact, learn, and engage in social activities. It can be a location where sporting events are organized, language classes are offered, an immigrant center is established, feeding programs for the poor and elderly are developed, health programs are held, cooking classes are offered, etc. Our schools can be powerful evangelistic centers that build bridges in the community between different religious groups. Within these educational centers, a variety of clubs, such as traveling or reading clubs, welfare outreach, lifelong learning programs, agricultural programs, Bible study classes, anti-stress and anti-addiction programs could be offered; and maybe even a bakery and/or cafeteria for the community could be built. We need to be creative in offering relevant programs to build strong community ties. For everyone—but especially for young people—friendship is evangelism. Our schools should be safe places for fellowship, friendship, and emotional healing. Smaller schools may wish to collaborate with other schools nearby or work closely with their local conference to source the individuals needed to support the plan.

5. This type of living and learning community needs a worship center, creating an increasingly deep need for the church because an active community will be a worshiping community. Membership in the church will grow naturally as people become integrated into the school's activities, and they will be attracted by the balanced Adventist lifestyle, which will lead them to be attracted to the beauty of the Adventist message and the living God. The Bible will thus be studied with enthusiasm and joy.

6. A community of love attracts and transforms people. The early church lived, worked, served, and worshipped together, and this is why God added many to their community of faith (see Acts 2:42–47). The symbiosis of schools and churches invites people to engage in different interactions, activities, and develop meaningful friendships. When people play, laugh, or study together, lasting relationships are formed.

7. Close collaboration between the

The symbiosis of schools and churches invites people to engage in different interactions, activities, and develop meaningful friendships. When people play, laugh, or study together, lasting relationships are formed.

pastor and the principal is needed, and we (the Seminary) aspire to teach pastors how to develop healthy and meaningful relationships with school administrators. The school should not only be an education center, but also a church during the week.

The new seminary class is very practical. Andrews University's Department of Discipleship and Religious Education is leading in this important endeavor. Pastors should become the *influencers* within the church as they grasp this new concept and gradually implement these ideas in their church community. So we are giving our student-pastors field practicums. Under the leadership of their professor, they spend several days visiting various-size successful schools, in order to learn from observation what actually works in the field. They are being taught how to maintain and grow current schools and how to create new ones so education can be revitalized and flourish in many parts of our NAD territory and the world field.

Our God is an awesome God, and He wants to care for children and young adults because He loves them. To do so, He needs dedicated, cheerful, and contagious people to build this wide community of faith, love, and hope.

In this new course, we are also teaching pastors how to integrate into church life young adults who have recently graduated from Adventist and state colleges and universities. The transition between university and church is where we usually either keep or lose our young people.

In the seminary, we are promoting the foundational principles of Christian education and particularly the Adventist philosophy of education. As we know, these basic principles are perfectly outlined in the book *Education* by Ellen G. White. She expressed a famous dictum connecting education and redemption, which we need to again put into practice: "In the highest sense the work of education and the work of redemption are one, for in education, as in redemption, 'other foundation can no man lay than that is laid, which

is Jesus Christ.' 1 Corinthians 3:11."[6] She aptly explains: "To restore in men and women the image of their Maker, to bring them back to the perfection in which they were created—this was to be the work of redemption. This is the object of education, the great object of life." Love, the basis of creation and of redemption, is the basis of true education."[7] She admonished that we ourselves learn the science of the cross and teach it to our young people: "The revelation of God's love to man centers in the cross. Its full significance tongue cannot utter; pen cannot portray; the mind of man cannot comprehend. . . . Christ crucified for our sins, Christ risen from the dead, Christ ascended on high, is the science of salvation that we are to learn and to teach."[8] "Let the youth make the word of God the food of mind and soul. Let the cross of Christ be made the science of all education, the center of all teaching and all study."[9]

Please pray for the teacher of this new class because he has a noble task to connect the seminary more closely to the NAD Adventist educational system and churches and, through our international students, the world field. This professor is responsible for a variety of field trips designed to teach and give pastors practical lessons on ensuring that religious education involves close collaboration among the school, church, and home. He is teaching seminarians and youth leaders to be disciplers rather than only pastors, and teaching pastors how to cooperate with educators in maintaining schools and creating new ones that become vibrant centers of congregational life and mission. Established churches would become affiliates of these schools, and new church plants could be established on the campuses of these schools. Teachers will help pastors to realize that equipping young people and giving them responsibilities is a powerful way to ensure their involvement in and commitment to local churches.[10]

Transitioning to this model will result, I strongly believe, in strengthening the pastor's own Adventist identity and lifestyle, and thereby helping him or her discover how to deliver our message in even more relevant ways through deepening close collaboration between the church, schools, and parents; and fostering a rich daily walk with God that will empower them to become an influential magnet to draw secular families, immigrants, and the larger community to God. By having the *school* in close connection with the *church*, both will become an important part of *community* life. In this way, community will be built around children and families and expand to reach and fulfill the different needs of people who live in the vicinity, and who will become the church's real neighbors. True Christianity is to love God above all from all our heart, mind, emotions and will, and our neighbors as we love ourselves, or better, as Jesus loves us (Luke 10:17; John 13:34, 35).

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This article reviews key findings of several landmark studies on the impact of Adventist education on Adventist students attending denominational schools, with the goal to inspire continuing research and further study.

Since the Seventh-day Adventist Church invests significant resources in elementary and secondary education, it is important to determine what impact its schools have on students. Schools affect students in both planned and unplanned ways. The Adventist educational curriculum is developed to foster desired goals and objectives, but schools also have an impact on students in areas that are not specifically taught in the curriculum. Based on data from research studies between 1985 and 2014, this article describes how attendance at an Adventist school in the North American Division (NAD)[1] relates to achieving the goals and objectives of Adventist education.

Ellen White outlined the goals of Adventist education in broad strokes, emphasizing the breadth and depth of outcomes desired. In terms of breadth, she called for "the

breadth and depth of outcomes desired. In terms of breadth, she called for "the harmonious development of the physical, the mental, and the spiritual powers."[2]

She believed that, rather than schools' "imparting to them only technical knowledge," students should be inspired "with principles of truth, obedience, honor, integrity, and purity" and "above all else, to learn life's great lesson of unselfish service."[3] In terms of depth, she declared that "Higher than the highest human thought can reach is God's ideal for His children. . . . [They] will advance as fast and as far as possible in every branch of true knowledge."[4]

The NAD Office of Education Website contains the following statement of the Adventist philosophy of education and its core curriculum goals:

- "The Seventh-day Adventist Church recognizes God as the ultimate source of existence, truth, and power. In the beginning, God created in His image a perfect humanity, a perfection later marred by sin. Education in its broadest sense is a means of returning human beings to their original relationship with God. The distinctive characteristics of this Adventist worldview, built around creation, the fall, redemption, and re-creation, are derived from the Bible and the inspired writings of Ellen G. White.
- "The aim of true education is to restore human beings into the image of God as revealed by the life of Jesus Christ. Only through the guidance of the Holy Spirit can this be accomplished. An education of this kind imparts far more than academic knowledge. It fosters a balanced development of the whole person—spiritual, physical, intellectual, and social-emotional—a process that spans a lifetime. Working together, homes, schools, and churches cooperate with divine agencies to prepare learners to be good citizens in this world and for eternity.
- "Learners will choose to accept God as the Creator and the Redeemer.
- "Learners will grow in their knowledge and understanding of God's creation.
- "Learners will creatively apply their spiritual, physical, intellectual, and social-emotional knowledge.
- "Learners will demonstrate their commitment to the Creator through service to others."[5]

These statements combine three elements: (1) the curriculum is based on Scripture and the writings of Ellen G. White; (2) aims are to be both spiritual (e.g., Christian, Adventist) and non-spiritual (e.g., mental, physical, social) areas, and (3) the desired outcomes embrace the cognitive (e.g., knowledge, understanding, application), affective (e.g., attitudes and values) and behavioral (e.g., lifestyle) domains.

attitudes and values), and behavior (e.g., lifestyle) domains.

This article reviews published and unpublished reports of research projects that evaluated the extent to which NAD schools accomplished important goals of Adventist education. In addition, secondary analyses of data sets of major research projects were conducted for this article. The researchers for the studies referenced in this article collected data for hundreds of outcome variables; because of space limitations, only the results for the most important outcomes directly related to the objectives of Adventist education are reviewed here. An earlier, more comprehensive report of this review is available online. (See https://bit.ly/2ruL41q (https://bit.ly/2ruL41q) for a more detailed explanation of sampling and data collection procedures).[6]

> "The aim of true education is to restore human beings into the image of God as revealed by the life of Jesus Christ. Only through the guidance of the Holy Spirit can this be accomplished. An education of this kind imparts far more than academic knowledge. It fosters a balanced development of the whole person—spiritual, physical, intellectual, and social-emotional—a process that spans a lifetime. Working together, homes, schools, and churches cooperate with divine agencies to prepare learners to be good citizens in this world and for eternity."

In this article, educational outcomes are classified into six categories, based on the three domain areas (cognitive, affective, and behavior), and two content areas spiritual outcomes and non-spiritual outcomes (mental, physical, and social).

The degree to which the outcomes of Adventist elementary and secondary education indicated above were achieved are evaluated (1) for Adventist students who had not attended Adventist schools, (2) for those who had attended Adventist schools for part, but not all of their schooling, and (3) for those who had attended only Adventist schools. Adventist students in Adventist schools are compared to Adventist students not in Adventist schools or in public schools. This review will not evaluate the impact of different methods or different experiences within Adventist education. While some studies controlled for other variables such as home characteristics, including parents' religious affiliation, and church characteristics, these findings will not be reviewed in this article.

Research Studies

This article reviews 18 research studies/reports on 12 sets of data. Both original analyses and secondary analyses of the data sets done for this article are included. Six of the studies are doctoral dissertations with relatively small sample sizes and a narrow focus: Minder (1985), Rice (1990), Epperson (1990), Pawluk (1992 and 1993), Carlson (1996), and Santiago (2014).[7] Three of the studies involved major research projects with large sample sizes and a broad scope: The Youth Retention Study—Dudley (1989), Dudley and Kangas (1990), Dudley (2000), and Thayer (2008); Valuegenesis[1]—Dudley (1992) and Thayer (2008); and CognitiveGenesis—Cruise, Kido, and Thayer (2007), and Thayer (2013).[8] Three of the studies involved large multi-year projects with large sample sizes but with a narrow focus—all conducted by Thayer (1978), (1992), and (2006).[9]

Results

The impact of Adventist schools on students is presented for outcome variables in seven sections: general results, cognitive spiritual outcomes, cognitive non-spiritual outcomes, affective spiritual outcomes, affective non-spiritual outcomes, behavior spiritual outcomes, and behavior non-spiritual outcomes.

The impact of our church's schools on the objectives of Adventist education are reported as having one of three outcomes: a positive relationship, a negative relationship, or no relationship. A positive relationship means Adventist students in Adventist schools met the objectives of Adventist education at a higher level than Adventist students not enrolled in denominational schools (most of whom were in public schools), or that students with more years in an Adventist school scored higher in meeting the objectives of Adventist education than those who had spent fewer years in an Adventist school. A negative relationship means Adventist students in Adventist schools met the objectives of Adventist education at a lower level than Adventist students not in denominational schools, or that students with more years in an Adventist school scored lower in meeting objectives of Adventist education than those with fewer years in an Adventist school. No relationship means there was no difference in meeting the objectives of Adventist education between Adventist students in church-operated schools and Adventist students in non-Adventist schools, or between Adventist students with more years in Adventist schools and those who had spent fewer years in Adventist schools.

General Results

Two major research projects dealt with a large number of subjects and a broad range of variables related to desired educational outcomes: Valuegenesis[1] and the Youth

variables related to desired educational outcomes: Valuegenesis[1] and the Youth Retention Study. Five analyses are reported in this article for these research projects.[10]

Dudley and Thayer[11] reported on the Valuegenesis[1] study and Dudley and Kangas, Dudley, and Thayer[12] reported on the Youth Retention Study.

Both studies found mixed results—for some outcomes, there was a positive relationship between Adventist education; but for many others, there was no relationship. Only two variables favored Adventist students not in Adventist schools—social action and social concern. On most variables, there was a stronger relationship between desirable outcomes and attending Adventist secondary schools than with attending Adventist elementary schools.

The Impact of Adventist Education on Cognitive Spiritual Outcomes

Only one study dealt with the impact of Adventist education on cognitive spiritual outcomes—Thayer (1992).[13] Student achievement on cognitive (e.g., knowledge, understanding) outcomes related to the NAD Bible/religion curriculum was positively related to years of Adventist education.

The Impact of Adventist Education on Cognitive Non-spiritual Outcomes

Four studies dealt with cognitive non-spiritual outcomes. These studies surveyed K-12 students from the Atlantic Union, Southern New England Conference, North Pacific Union, and the North American Division[14]—Thayer (1978), Pawluk, Thayer (2006), and Thayer (2013).[15] All of these reports evaluated both academic achievement (reading, language arts, mathematics, social studies, science, and sources of information) and cognitive ability (verbal, quantitative, and nonverbal). The most recent and comprehensive research was CognitiveGenesis,[16] which studied students in grades 3 to 9 and 11 in all Adventist schools (K-12) in North America from 2006-2009. Results of all of these studies indicated that students in Adventist elementary and secondary schools achieved much above the national average and achieved much above what would be predicted by cognitive ability tests. The relationship held true for all grades, for all types of schools (small and large), and at all cognitive ability levels. These studies showed a positive relationship between the number of years of Adventist education and development of both academic achievement and cognitive ability.

The Impact of Adventist Education on Affective Spiritual Outcomes

Two studies dealt with affective spiritual outcomes—Valuegenesis[1] and the Youth Retention Study. In the first year of Dudley's 10-year Youth Retention Study, all subjects

were asked to evaluate the influence of home, church, and school on their spiritual experience. Dudley and Kangas[17] reported that the percentage of subjects who thought each group was a helpful influence on their spiritual experience was 74 percent for members of their home family, 55 percent for members of their church family, and 34 percent for members of their school family. Since approximately half of the students were in public schools, the low rating for the effect of schools on spiritual experience is understandable. In his reanalysis of the Youth Retention data, Thayer's 2008 analysis[18] found that limiting the analysis to students in Adventist schools and using more direct questions such as "What I learned at home," "What I learned at church," and "What I learned at school," the percent of subjects who thought each entity was a helpful influence on their spiritual experience was 82 percent for home, 74 percent for church, and 70 percent for school.

> The results of these research studies, although more than 10 years old, are quite positive regarding the effect of Adventist education on a broad array of outcomes. The author of the most comprehensive study containing data that can be used to measure both the short-term and long-term impact of Adventist education states that ". . . the information gathered during 10 years [1987-1997] is a ringing testimony to the benefits of Adventist education. . . . Some of the differences . . . were great and some were small, but with one exception [social concern], they all favored Christian education."

Both Valuegenesis[1] and the Youth Retention Study found consistent positive correlations between Adventist education and most variables related to the Adventist Church, such as denominational loyalty, denominational orthodoxy, relationship to the church, intention to remain an Adventist, and intention to marry an Adventist. There were inconsistent findings between Adventist education and more general spiritual outcomes, such as faith maturity and commitment to Jesus Christ and one variable related to the Adventist Church—the intention to be an active Adventist.

The Impact of Adventist Education on Affective Non-spiritual Outcomes

Three studies examined affective non-spiritual outcomes: Valuegenesis[1], the Youth Retention Study, and Carlson.[19] When looking at the relationship between Adventist education and attitudes toward standards of behavior, one study found that students

attending an Adventist school were more in agreement with the Adventist standard of no premarital sex than those not enrolled in an Adventist school. Another study found no

relationship between years of Adventist education and agreement with six Adventist standards—those related to tobacco, alcohol, dancing, drugs, sex, and dress, but a negative relationship between Adventist education and agreement with three standards—those related to jewelry, rock music, and attending movie theaters. Two of the studies found a negative relationship between Adventist education and social concern: One study found that students in Adventist schools scored lower on social concern than those in public schools, and one study found students with fewer years in an Adventist school scored higher on social concern than those with more years in an Adventist school.

The Impact of Adventist Education on Behavior-related Spiritual Outcomes

Eight studies examined behavior spiritual outcomes, the most of any of the seven sections. Most studies found positive relationships between Adventist schooling and behavior spiritual outcomes, both general Christian outcomes such as attending church, reading the Bible, personal prayer, paying tithe, and talking to others about one's faith and Adventist-related outcomes such as Adventist church membership, being an active Adventist, not dropping out or no longer attending church, and marrying an Adventist. One study found negative relationships between Adventist education and the Adventist piety and Adventist evangelism scales.

The Impact of Adventist Education on Behavior Non-spiritual Outcomes

Research dealing with behavior non-spiritual outcomes was reported by two studies. The only outcomes reported in this section are related to health and social action. One study found a positive relationship between the number of years of Adventist schooling and taking care of physical health while in school, and the other study found no relationship between the number of years of Adventist schooling and taking care of physical health five years later. Both studies found a negative relationship between number of years in an Adventist school and social action.

Conclusions and Recommendations

The results of these research studies, although more than 10 years old, are quite positive regarding the effect of Adventist education on a broad array of outcomes. The author of the most comprehensive study containing data that can be used to measure both the short-term and long-term impact of Adventist education states that "... the information gathered during 10 years [1987-1997] is a ringing testimony to the benefits

information gathered during 10 years [1987–1997] is a ringing testimony to the benefits of Adventist education. . . . Some of the differences . . . were great and some were small, but with one exception [social concern], they all favored Christian education."[20]

However, one must be cautious in interpreting the results reported in this article because presence or absence of a relationship is not sufficient evidence for presence or lack of a causal link between Adventist education and outcomes being studied. It is difficult to separate out the effects of parents, church, and school. For example, it is reasonable to assume that parents who more closely identify with the Adventist Church are more likely to send their children to an Adventist school. In addition, difficulties in identifying and surveying a representative group of Adventist public school students and following up on persons who have dropped out of the church make one cautious in interpreting the results reported here. Furthermore, most of these studies are more than 10 years old. For this reason, research on the impact of Adventist schooling on students must continue.

While positive relationships can be assumed to exist between Adventist education in the North American Division and desirable outcomes in many cases, most are not large; and for many important outcomes, no relationship was found. Even for variables where there was a strong positive relationship between the outcome and attending Adventist schools, such as dropping church membership, the outcome still leaves much room for improvement. For example, Dudley[21] found that 38 percent of the youth who left the church between the ages of 16 and 17 and 25 and 26 had obtained most of their education in Adventist schools.

In some areas, both positive and negative results were found. Dudley and Kangas concluded that within the NAD, "Adventist schooling produces belief in doctrine, faith in an underlying ideal, and resolutions for the future. It does not necessarily result in a more personally experienced religion."[22]

The impact of Adventist education in North America seems to be more pronounced in denomination-specific areas such as remaining an Adventist than in more general Christian areas such as commitment to Jesus Christ. Researchers found a negative relationship between Adventist school attendance and agreement with some Adventist standards (jewelry, rock music, and attending movie theaters) and social concern and social action.

While the results of these studies are quite positive in the effect of Adventist education on most outcomes, at least in the North American Division, they suggest areas where Adventist education in NAD could invest resources to determine the dynamics of why the outcomes in some areas were not as positive as desired and how they can be improved. Adventist schools need to continue and strengthen their work that has resulted in

Adventist schools need to continue and strengthen their work that has resulted in positive results related to Bible knowledge, academic achievement, relationship to the Adventist Church, and most spiritual outcomes. But more attention needs to be given to how Adventist schools can be more effective in having their students meet objectives related to having a personal relationship with Jesus, intending to be an active Adventist, social concern and action, and Adventist behavior standards.

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NOTES AND REFERENCES

1. Dissertations included in this list studied students in the North American Division with one exception. The study by Edwin P. Alicea Santiago, *The Relationship of Family, Church, School, Peers, Media, and Adventist Culture to the Religiosity of Adventist Youth in Puerto Rico* studied students in Puerto Rico, which is part of the Inter-American Division. Unpublished doctoral dissertation, Andrews University, 2014.
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8. Roger L. Dudley, *A Ten-year Study of Youth Retention in the Seventh-day Adventist Church in North America* (Berrien Springs, Mich.: Andrews University Institute of Church Ministry, 1989); _____ and Janet Leigh Kangas, *The World of the Adventist Teenager* (Hagerstown, Md.: Review and Herald, 1990); Roger L. Dudley, *Why Our Teenagers Leave the Church: Personal Stories From a 10-year Study* (Hagerstown, Md.: Review and Herald, 2000); Jerome Thayer, "Youth Retention Study Reanalysis." Unpublished manuscript. Andrews University, 2008; Roger L. Dudley, *Valuegenesis: Faith in the Balance*. Riverside, Calif.: La Sierra University Press, 1992); Robert Cruise, Elissa Kido, and Jerome Thayer, "CognitiveGenesis Yearly Report" (2007). Reports are available at https://crae.lasierra.edu/cognitivegenesis-2/publications/; (https://crae.lasierra.edu/cognitivegenesis-2/publications/;) Jerome Thayer, "CognitiveGenesis Report." Unpublished manuscript. Andrews University, Berrien Springs, Mich., 2013.
9. Jerome Thayer, "Will My Child Suffer Scholastically if He Attends Church School?," *Adventist Review* 155:35 (August 31, 1978): 899-901. _____, "What We Have Learned About Religious Education From the Religion Achievement Test Results." A report prepared for the North American Division Commission on Religious Education. Unpublished manuscript. Andrews University, 1992; _____, "Southern New England Research Report." Unpublished manuscript. Andrews University, 2006.
10. Three Valuegenesis studies by V. Bailey Gillespie collected data on faith maturity, values, and commitment from Adventist students in Adventist and public schools in the North American Division. Valuegenesis[1] (1990), cited in this review, set the foundation for subsequent studies: Valuegenesis[2] (2000) and Valuegenesis[3] (2010). For more information on these subsequent studies, contact the Hancock Center for Youth and Family Ministry at hcyfm@lasierra.edu. Additionally, search http://circle.adventist.org, (http://circle.adventist.org,) using keyword *Valuegenesis* for a list of related reports: http://circle.adventist.org/search/?search__query=%E2%80%9CValuegenesis%E2%80%9D (http://circle.adventist.org/search/?search__query=%E2%80%9CValuegenesis%E2%80%9D).
11. 1Roger L. Dudley, *Valuegenesis: Faith in the Balance* (Riverside, Calif.: La Sierra University Press, 1992); Jerome Thayer, "The Impact of Adventist Schools on Students."
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13. Thayer, "What We Have Learned About Religious Education From the Religion Achievement Test Results."
14. For a breakdown of the various grade levels sampled in each study, see Thayer, "The Impact of Adventist Schools on Students."
15. _____, "Will My Child Suffer Scholastically if He Attends Church School?" ; Pawluk, "A Comparison of the Academic Achievement in Multigrade and Single-grade Elementary Church-school Classrooms"; Thayer, "Southern New England Research Report"; _____, CognitiveGenesis Report, 2013.
16. See the four CognitiveGenesis yearly reports available at https://crae.lasierra.edu/cognitivegenesis-2/publications/. (https://crae.lasierra.edu/cognitivegenesis-2/publications/.) The 2006-2009 study collected data on students' academic achievement in Adventist schools throughout the United States, Canada, and Bermuda. Data were analyzed separately with one combined report for eight unions. The Canadian Union was not included in the combined report because Canadian students take different achievement and ability tests. For more information, see "Assessing Adventist Academics: A Mid-point Update on Cognitive Genesis" by Elissa E. Kido, Jerome D. Thayer, and Robert J. Cruise in *The Journal of Adventist Education* 71:2 (December 2008/January 2009): 5-10: http://circle.adventist.org/files/jae/en/jae200871020506.pdf. (http://circle.adventist.org/files/jae/en/jae200871020506.pdf.)
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Teaching and Assessing Language Skills Online

In a face-to-face classroom, teaching and assessing language skills can be a formidable task. With the arrival of the digital era and online education, teachers have a new assignment—to teach and assess language skills online.

Can language skills really be taught effectively online? If so, what strategies are most effective? Can these skills be properly assessed in the online environment? If so, how? This article explores strategies that can be used to effectively teach and assess the language skills of students in online language classes at the undergraduate and graduate levels.

Strategies for Teaching Language Skills Online

This section presents five strategies that can be used to teach language skills online: (1) video production, (2) online forum discussion, (3) Web conferencing, (4) Website creation, and (5) process writing. These strategies aim to develop the following language skills: listening, speaking, reading, and writing. None of them focuses on one specific language skill, but rather endeavors, where possible, to integrate all of them.

Video Production

This strategy can be used by both teachers and students. The teacher can create video lectures, to which students respond by creating their own videos. In an online class, lectures can be prepared in written, audio, and/or video formats—or better yet, in all three modalities. Students may need to choose the written or audio format, depending on local conditions such as the strength or speed of the bandwidth offered by their Internet service provider. The video format, however, provides a stronger teacher presence, as it allows the instructor to model the different aspects of the language and to inspire

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students to attain the same level.

Videos can also be utilized to demonstrate various language skills such as pronunciation. For example, Arceli Rosario, the professor for an online class on listening and speaking at the Adventist International Institute of Advanced Studies (AIIAS) in the Philippines, prepared several five- to seven-minute videos to demonstrate how each phoneme is produced and modeled how sample words such as minimal pairs (words that vary by a single vowel or consonant sound, e.g. ch**i**p/ch**ea**p or **f**an/**v**an) and tongue twisters should be read. She then shared the videos and scripts with the students and asked them to prepare their own videos. After completing the videos, the students uploaded them to Moodle, the school's learning-management system (LMS), thereby making their work available to the other members of the class. (See Box 1 for video production tools.)

The professor next created performance videos modeling how to recite poems and speeches, after which the students did likewise and interpreted selected pieces. When one student submitted his video, the professor commented on how much his speaking skills had improved. The student explained that the results were worth the effort he put into the process. He watched several videos to listen and observe how other performers interpreted the piece, practiced for many hours, recorded numerous takes, and even asked friends to critique his performance. Other students, even those who started the class at an advanced level, revealed that they had gone through a similar process.

This strategy encourages students to engage in a process of becoming proficient speakers of the language and mastering language skills based on the modeling provided by the teacher and others.[1] In addition, video production provides the students with an opportunity for self-critique and reflection,[2] essential skills in language learning.

Scene from a video depicting a tongue-twister demonstration.

Box 1. Helpful Video Production Software Tools*

Digital devices make it easy to integrate videos into the online classroom. Cameras, phones, tablets, laptop computers, etc., are all capable of producing high-quality videos in formats that can be uploaded to the LMS. Several tools exist to help produce videos from lectures, white-board illustrations, or even the computer screen.

Here are a few ways to integrate video and video production resources into the online classroom:

1. Slideshow narration. Audio narration can be attached to PowerPoint (PC) or Keynote (iOS) presentations. Once the presentation is completed, select "Record Slide Show" to add voice-over audio to each slide. These presentations can also be saved as a movie. Helpful directions can be found here: Windows http://bit.ly/2FlsC4w for Microsoft products; iOS https://apple.co/2toTxqe for Mac products.

2. Screencasting. Video tutorials can be shared using the screencasting technique, which allows the user to add a voiceover through step-by-step processes shown on the computer screen. Tools such as Adobe Captivate, Camtasia Studio, QuickTime player, or SangIt are just a few that can be used to create and edit the video segments.

3. Animations. Add images and illustrations to video presentations by using software such as Adobe Voice and VideoScribe. These tools can help animate a video—some also provide music that can be included in the soundtrack.

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* Sandi Lin, "Three Easy Methods to Create eLearning Videos," *eLearning Industry* (September 2014): https://elearningindustry.com/3-easy-methods-create-elearning-videos.

In the same class, using video production as a platform, the professor raised the requirements. Each student was assigned to train one or more persons to perform a selected literary piece. The students were told to select pieces that fit their trainees' skill levels and personalities. Some arranged the pieces into a speech choir or a responsive reading. Keeping in mind the plot and theme of their selected pieces, the students chose the setting, sound track, choreography, and other elements that would enhance the performance of their trainees. After filming the performances, they uploaded their videos to YouTube and provided the link in Moodle so that the professor and the other members of the class could view them.

September Jane Ranarez's video presentation of the poem "And Still I Rise"—written by Maya Angelou—is available at https://www.youtube.com/watch?v=_yxoQoVDago&t=20s.

Creating an Inviting Virtual Classroom

The online teacher must strive to create an accepting and comfortable virtual classroom atmosphere because anxiety can be high in language classes.[3] Video production can help online students build a sense of community and minimize anxiety levels. More than 18 years ago, Garrison et al.,[4] in their groundbreaking seminal work, emphasized the need to foster social presence (which refers to students' need to relate with one another and with the teacher at the social and emotional level), in the online environment.

More recent studies on social presence have confirmed its importance in ensuring the success and satisfaction of students in online education.[5] In the class mentioned earlier, the professor required the students to create three-minute videos to introduce themselves. Students attested that seeing and hearing their classmates helped them feel connected to one another.

From the start of the class, it is important that students see each of their classmates as a real person, not just a name—an individual with a face and a voice. This helps to ensure that the virtual classroom atmosphere is supportive of learning.

In addition, the professor designed the course so that each module began with a devotional time, where each student was assigned to present a two- to three-minute message and end with a short prayer recorded in video format.[6] Then, using the video as a springboard, the class shared experiences and reflections. This exercise provided a venue for students to make connections using their language skills, not only on a personal level, but also on a spiritual one.

Online Forum Discussion (OFD)

Jose and Abidin cite Rouse's definition of an online forum discussion (OFD) as "any online 'bulletin board' which is used by the participating writer to post or write his/her comments or opinion on a given topic expecting other participants to post their comments in response to what has been posted first."[7] In a typical online course at AIIAS, the professor posts two discussion questions for every module. The students are asked to respond once to each discussion question and at least twice to each of their classmates' posts.

In this platform, students utilize different communication strategies and hence use and develop a variety of skills. They explain, agree, disagree, defend their position, and question others' ideas. In the process of doing so, they read to make informed responses and learn to cite sources both in the in-text and in the reference entries, thereby honing their critical-thinking and academic-writing skills.

Online discussion forums, especially when used with small classes, provide for rich student-student and teacher-student interaction. To ensure the success of a discussion forum, the frequency and kinds of participation required must be clearly articulated in the course syllabus and rubrics. Because the conversation is threaded (a group of messages attached to an original post), the teacher or any member of the class can easily follow the discussion and may choose to continue the conversation either in real-time (synchronous) or at a later time (asynchronous). Additional features such as audio and video allow for a more-interactive exchange.[8]

In an OFD, every student has the space and time to share his or her ideas.[9] Because the quality and the number of students' posts are carefully checked and evaluated by the teacher, and read by their peers, the students are motivated to respond. In an action research on OFD in an

EFL context, Jose and Abidin found that "peer interaction and discussion played a major role . . . in promoting [students'] writing."[10] Students also learned how to exercise mutual respect when interacting with one another. The researchers explained that "in the OFDs, the learners are conscious of other members reading their ideas, seeing their possible grammatical or spelling errors."[11] Instructors should make sure that students are aware that both their peers and teacher will be reading and critiquing their skills. The syllabus is a good place to include this information. Also, instructors can model for students how to respond to other people in a respectful manner online.

Synchronous Web Conferencing

Synchronous Web conferencing, also known as video conferencing, is the online experience that most resembles face-to-face interaction. It can be delivered using different platforms such as Adobe Connect Pro, Blackboard Collaborate, Google Hangouts, Skype, WebEx, and Zoom, to name a few. This format works well for interactive lecture, group discussion, consultation, and free speech practice where students role-play given situations, or for controlled speech practice where students deliver/perform assigned materials.

Synchronous Web conferencing has many benefits and advantages. Students can access synchronous meetings as long as they have an Internet connection; multiple sessions can be planned to accommodate students in different time zones; and most Web conferencing tools can be accommodated by LMS platforms. However, these advantages can become disadvantages when Internet service is poor, when time zones cannot be accommodated, or when the system does not work well with the LMS platform.[12] Despite these technical concerns, synchronous Web conferencing helps build language skills through the use of built-in interaction tools that allow students to respond in real time, ask questions, and engage in active learning. According to Liang, "Online peer response that blends spoken, written, and electronic communication can promote student motivation, participation, and collaboration."[13] Synchronous Web conferencing, then, is especially useful for activities designed to develop listening and speaking skills because students must respond immediately, rather than relying on getting extra time to post or share their responses.

Website Creation

Website creation involves choosing a Website building platform, creating and registering a domain name or Web address, selecting a graphic theme, and creating and organizing content.[14] The first step is the selection of a building platform such as WordPress, Wix, Weebly, or Square, most of which are free, with a fee only if the user selects advanced features. Other basic steps in this activity include choosing the template and customizing the Website interface and functions. Most platforms provide step-by-step guidance to help users create essential components.

The most important component of this activity, however, is the creation of content. At this step, students upload the materials required for the class. For a language class, these materials can be videos, journals, case studies, critical analyses, essays, and other materials such as blog posts. Moreover, in addition to journaling, students write thoughts and reflections in blogs. They can also link videos they have produced to the Website and, with permission, post relevant videos created by others or articles they may deem helpful to the language development of the entire class. Among their responsibilities are to screen and manage the materials posted on the Website, since these will form part of the basis for their grade.

As students create their own materials to meet the requirements for the assignment, they must pay close attention to avoiding plagiarism and improper use of copyrighted materials. Obtaining permission to use someone else's materials is both legally and morally mandatory when sharing information in a public space, and this should be stated in the syllabus. Credit should be given to sources used in creating the assignment, whether "text, photographs, music, or artwork."[15] Students should be taught to research the following areas before using content created by someone else:

1. Who owns the material?
2. Is permission needed to use or reproduce the material?
3. What kind of copyright is associated with the material?
4. Will there be a fee for the educational use of the material?

Once these questions are answered, the students will need to consider how long it will take to obtain permission. In some instances, it could take four to six weeks or more, so planning for permission early is important. Most importantly, the copyright owner's permission should be in writing with the terms clearly stated.[16] These steps are important and can help the student avoid fines and penalties for using or improperly citing materials that are protected by copyright law—and will also protect the teacher and educational institution from lawsuits.

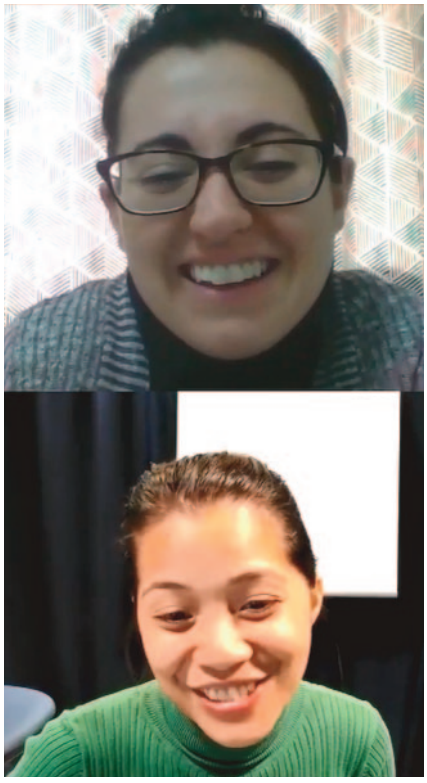
When creating Websites, students should identify relevant materials that will help them to develop their language skills. The self-regulated learning model posits that learners are capable of making decisions for themselves and, if motivated, can learn effectively once given the right tools.[17] Creating a personal Website is

an excellent tool in facilitating language learning.

The students' Websites can function as e-portfolios where they store all the work they have produced for the course and where they can upload pertinent resource materials they have obtained permission to use. Storing such materials online helps students to trace their learning and evaluate their growth in each of the language macro-skills (such as listening, speaking, reading, and writing)[18] which is a metacognitive activity.[19] In addition, the Web is a good place to store information because of its accessibility.

Student Websites can also function as good venues for language acquisition and meaningful use since it will be necessary for students to view videos and listen to audio recordings as they create their sites. They also learn to use language in context as they create blogs and respond to the comments posted on their blogs. Not only do they interact with their classmates and teacher, but they may also have broader contact with people from all over the world since the Website is accessible to the public.[20] All these benefits are supported by Krashen's input hypothesis, which states that learners increase their knowledge and understanding when they begin to comprehend language slightly above their current level,[21] and Vygotsky's socio-cultural theory, which claims that language is best learned in a social context. Furthermore, since Website creation is also one of the class projects, students may also benefit from working collaboratively to reach their desired level of language skills.[22] Rubrics specifying expectations, assignment checkpoints at various stages of the project, and scheduled video conference progress meetings with students (whether with individual students or teams) are effective ways of making sure that students are submitting their own work and not that of another.

A Website created by all the students in the classroom (whether individually or in groups), ensures that learning is shared by everyone in the class. Students can read one another's work and reflections. As they work together, they build a community of learners.



Video conference with online students using ZOOM.

Process Writing

One of the best ways to teach writing is to teach students the process of planning, drafting, revising, and editing. Seow describes process writing as "a program of instruction which provides students with a series of planned learning experiences to help them to understand the nature of writing at every point."[23] Anchored in sociocultural theory, [24] this approach involves collaboration not only between teacher and student, but also among students. Carolan and Kyppo add that three important skills are developed in process writing—"responding (sharing), evaluating and post-writing, which comprises re-reading the text for the logical structures and cohesion, eliminating the redundant text and proofreading for speaking, grammar and vocabulary."[25]

How can process writing be taught effectively in an online environment? Using video conferencing and the discussion forum, teachers can provide students with the necessary instruction. Another way is to incorporate the use of Google Docs, an application that enables teachers and students to collaborate. Among Google Doc's features: It allows users to create documents; store and save automatically; share with other users; and edit, comment, and reply to comments synchronously (the class can work on the same document at the same time) or asynchronously. It also allows the user to view revision history. From the first step of planning—thinking of a topic and brainstorming among possible choices—to the final step of editing the written product, the class can engage in interactive feedback. Slavkov highlights one advantage of working on a writing project using Google Docs: "It allows instructors and peers to have a privileged view of the process of invention and creation in real time. That is, writers can be observed and can observe others as they write with Google Docs."[26] Dialogue with the teacher and peers that occurs while the student engages in process writing helps to promote better choices in many aspects of writing (e.g., word selection, sentence structure) and stimulates idea generation.

Strategies to Assess Language Skills Online

A variety of technology tools and Web applications make it possible to assess online language skills. Several strategies such as self-assessment (SA), peer assessment, facilitator assessment, and Web-based assessment have proved useful outside traditional classroom settings.[27] These strategies help students develop self-awareness, as well as ownership of and responsibility for, their own lan-

guage-learning experience.[28]

Learner self-assessment. According to Todd[29] self-assessment is an essential element in self-directed learning because a prime goal should be to develop learners' autonomy.[30] Teachers can use several approaches to encourage students to engage in self-monitoring and self-correcting.[31] In a speaking class, one strategy that has been used successfully is teaching students to use the dictionary, understand sound and stress symbols, and interpret them.[32] Teachers and students can create either audio or video recordings to effectively demonstrate correct pronunciation.[33] Firth recommends choral reading to help students fine-tune their speaking skills. This can be done effectively through a synchronous lesson in which the teacher models pronunciation skills for the students. As follow up, students can create an audio or video recordings of themselves reading assigned pieces. Recording their reading allows them to listen to their own speech, and with each replay, to identify areas for improvement such as pronunciation.[34] Video and audio recordings are just some of the online self-assessment strategies that enable students to self-critique their progress, based on samples and rubrics provided by the professor.

Journaling is another strategy that provides an opportunity for self-assessment. Students may respond to the following questions at the end of each lesson: What went well? What can be improved? What will I do to address areas needing improvement? These questions allow students to reflect on their strengths and weaknesses, to explore areas for growth, and to resolve to act on possible solutions. (See the article on e-journaling by Prema Gaikwad on page 23 of this issue).

Peer Assessment

Through peer assessment, students learn to evaluate the quality of another person's performance using set criteria or goals, after which they provide suggestions for improvement.[35] This type of assessment works well in activities such as coaching and peer feedback.

In this video clip, the teacher is modeling how to produce the /ey/ sound.

• ***Coaching.*** Coaching is an effective way to provide formative peer feedback through suggestions rather than correction.[36] Through peer coaching, students receive important suggestions on how to expand or refine their ideas and improve their performance in various learning tasks. These suggestions should be offered in a confidence-building, non-threatening way. Instructors should model effective ways of offering suggestions to correct, and also be prepared to intervene if peers are being harsh and critical. Questions such as "And what happens next?" or "What do you mean?" help students fine-tune their performance, build new skills, share ideas, teach one another, and solve problems.[37] Coaching helps students set goals for their learning, identify their strengths and overcome their weaknesses, and develop a plan for action.

Like other requirements, this peer-assessment strategy should be completed using a rubric. Students are divided into pairs and given specific instructions on how to assess the assignment, guided by the rubric. This not only gives them an authentic experience of how to critically examine the work of others, but also helps develop their ability to receive constructive feedback and develop a sense of accountability and responsibility for the feedback given to others. Coaching is ideal for big online classes where there are many participants who can be paired during coaching exercises.

• ***Peer review.*** A peer is generally defined as someone who occupies a similar position or ranking or someone who is tasked with the same assignment—a colleague or teammate. During peer review, students completing the same assignment provide corrective feedback based on a rubric and assignment guidelines.

This approach works best for academic writing. It is summative in nature, typically taking place as an assignment is nearing completion. Students are assigned partners and given specific instructions on how to provide feedback. The process allows students to review a particular classmate's work, give feedback on the content and formatting (which needs to be explained in the rubric), and edit other parts that need further corrections. Evaluating another person's

work with respect and care involves a number of higher-level cognitive skills. Students are better able to evaluate their own work and discover new ideas when they have observed and reflected on a range of approaches during peer review.

Facilitator Assessment

Online interaction provides the facilitator with a variety of opportunities to assess student learning. By actively facilitating the threaded discussions, the teacher can monitor the individual performance of students. Students in online courses at AIIAS attest that when professors (also called course facilitators) give timely and comprehensive feedback, their understanding of important concepts is deepened, and they are encouraged to engage in meaningful discussions. The use of rubrics increases student participation and enhances the quality of student output.

Web-based Assessment

The Web has almost endless possibilities as an instrument for language assessment.[38] One form of Web assessment is video conferencing through software such as Zoom, Skype, or Google Hangouts. Video conferencing enables teachers and students to have real-time interaction and to engage in activities that assess language skills. Other platforms, such as Blackboard, Canvas, D2L, Edmodo, Moodle, et cetera, enable the teacher to conduct quizzes and exams online and to provide immediate feedback.

Conclusion

There are a number of ways to teach and assess language skills online, but the strategies discussed in this article are basic best-practice approaches in an online modality. With strong technical support[39] and faculty development,[40] this modality can be very effective. ✎

This article has been peer reviewed.

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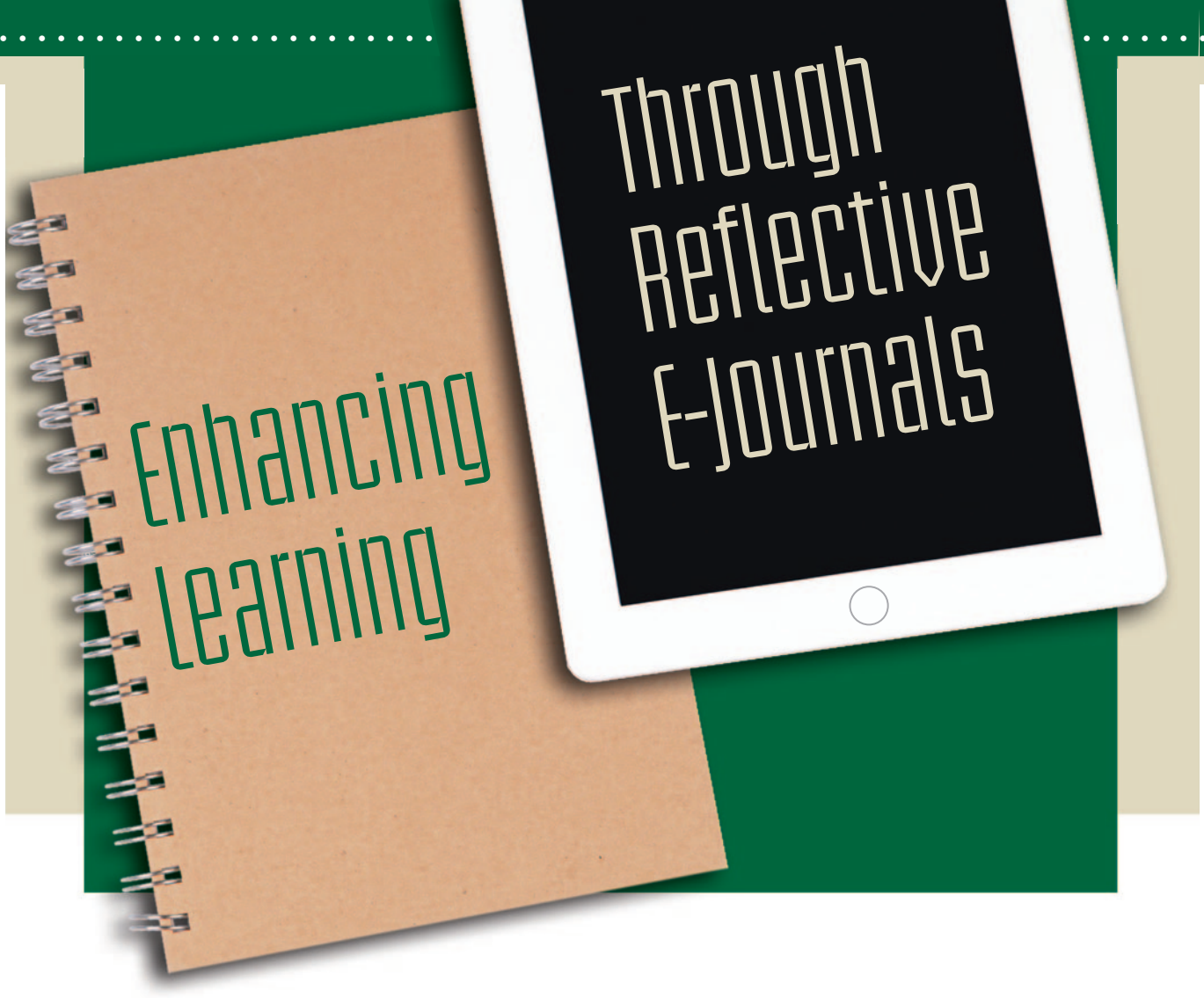

Journaling is an important and widely used instructional strategy that has become increasingly popular in both face-to-face and online classes. As a reflective activity, journaling gives a voice to students, allowing them to express their views about their learning experiences. It also provides teachers with timely feedback on what went well and what needs to be improved in the learning environment.

Journaling is a two-way process involving both the students and the teacher—students record their reflections, after which the teacher responds and gives prompt written feedback.

Journaling is not a new concept. The typical journaling tool is a book or diary where students record personal experiences. Its purpose usually is self-assessment and improvement, or recording life events.[2] More recently, journaling has been popularized in higher education[3] for multiple purposes, such as enhancing critical thinking and raising self-awareness of learning processes.

With the onset of online learning, e-journaling has taken the place of the traditional paper-based journal-

BY PREMA GAIKWAD

ing. Teachers who Web-enhance (face-to-face class backed by online support) or use blended learning (a flexible mix of face-to-face and online class sessions) find e-journaling to be a convenient option. For example, illegible handwriting (in both students' journal entries and teachers' responses) is no longer a problem, due to the text medium. More than five years ago, I switched from paper-based journaling to e-journaling in all my face-to-face classes while continuing to use e-journaling in the online courses. This article provides tips and suggestions for enhancing online coursework at the college and university levels through the effective use of e-journaling.

Reflection and Journaling

The impetus to write reflectively comes from God Himself, who told Jeremiah: "Write in a book . . ." (30:2, NRSV)[4] which highlights the importance of recording events and experiences before we forget them. "Do not forget the things your eyes have seen or let them fade from your heart" (Deuteronomy 4:9, NIV)[5] also reminds us that recording is a way to remember.

My own experience with reflective journals began when I was a graduate student at Andrews University (Berrien Springs, Michigan, U.S.A.) more than two decades ago. One of my professors consistently required learning journals in our classes. We were to turn in the journal notebook after each class, after taking sufficient time to reflect on the learning experiences. I enjoyed the reflective learning that took place during the journal experience because it was a means of communicating what I had learned. Reflective journaling gave me time to evaluate the learning experiences as well as a chance to share my thoughts about these experiences with the instructor. This convinced me to incorporate this learning tool into my own classes, and journaling has become an essential attribute of my classroom practice in higher education for the past two and a half decades.

Self-reflection has received much attention since the publication of John Dewey's early work *How We Think*.[6] Dewey highlighted the significance of reflection in fostering students' critical thinking and procedural skills. He emphasized that experience alone is insufficient for learning, but must be accompanied by reflection on the experiences.

Reflection is defined as "an important human activity in which people recapture their experience, think about it, mull it over and evaluate it. It is this working with experience that is important in learning."[7] Such reflection incorporates a blending of the mental and affective dimensions of human experiences. In the form of journaling, this reflection provides cognitive engagement that connects experiences during and after the class. Common indicators of cognitive engagement, as established by research, include students' "use of basic cognitive strategies such as rehearsal, elaboration, organization, and critical thinking; and self-regulatory strategies such as planning, monitoring, [and] regulating."[8] The affective dimension of learning is also critical to address.

Student responses to the learning environment are more readily observable in a face-to-face class than in an online setting. Journaling serves as a convenient vehicle to build better understanding between students and the teacher. However, creating an appealing learning climate at the beginning of the course is critical if students and teachers are to receive the optimal benefits of journaling.

E-Journals as Tools for Learning

The purpose of reflection through e-journaling is to provide learners with opportunities to (a) connect existing knowledge and new information learned; (b) react in personal terms to information that was learned; (c) deepen learning through cognitive engagement; (d) strengthen social connectivity between the student and teacher; and (e) track learning goals. Reflections allow the learner to express emotions or thoughts that act as barriers to learning, whether from an affective perspective (feelings, opinions, ideas) or a cognitive (prior learning) perspective. E-journals provide students with a structured procedure for expressing such concerns.

In the context of online learning, reflective journals have the potential to increase teacher-student interactions and to sustain this communication throughout the course. Valuable student concerns can be shared in a non-threatening fashion. Especially important is the value of "wait-time" for interactions, as the delayed response allows more reflective thinking, compared to instant answers.

Most e-journals are asynchronous. This gives students and teachers the opportunity to think twice before responding, which allows a healthy and comfortable, two-way exchange of ideas between the student and the teacher. In both face-to-face classrooms and online, journaling enables the teacher to personalize his or her responses to each student through feedback that enhances the learning experience.

Implementing and Assessing E-Journals

Since e-journaling is a requirement in all my classes, students are given instructions on how to complete this assignment at the beginning of the term. I share what is expected in terms of content, how often the journal entries are to be submitted, and the rubric that will be used for assessment (see Table 1). The journaling assignment is clarified through two main questions students must address: (a) What important and useful ideas have I learned? and (b) What would I like to see improved

Table 1. A Sample Rubric for Assessing E-Journals

Criteria	4 Exemplary	3 Proficient	2 Developing	1 Emerging
Reflection (Course content)	Critically analyzes the impact of course content on learning by giving specific examples from readings, lectures, discussions, and assignments.	Shares examples of how course content impacts learning by giving adequate examples from readings, lectures, and discussions.	Some examples are shared to show how course content impacts learning, primarily from readings and lectures.	Gives minimal statements of the impact of course content on learning.
Reflection (Learning experiences)	Shares clear statements of feelings, opinions, or thoughts about the learning experiences including challenges, concerns, or questions.	Shares non-specific statements of feelings, opinions, or thoughts about the learning experiences including challenges, concerns, or questions.	Some feelings, opinions, or thoughts about the learning experiences are shared in the entry.	Gives minimal statements of feelings, opinions, or thoughts related to the learning experiences.
Length	Full page, single-spaced, one-inch margins.	One-half page or more, single-spaced, one-inch margins.	At least one-half page, single-spaced, one-inch margins.	Less than one-half page.
Timeliness	Submits the document by the due date.	Submits the document by the due date.	Submits the entry later than the due date by a week or less.	Does not submit entry.

(either in the student's personal performance or course delivery)? The entries are uploaded to the learning-management system drop box at the end of each weekly unit, class period, or as determined by the instructor and stated in the syllabus.

Using this rubric, students are able to respond to the impact of course content (readings, lectures, discussions, and assignments) on their learning. The e-journal constitutes their personal response to all elements of the course, which often stimulates cognitive engagement that continues long after the class activities are completed. From the rubric, students learn that giving specific examples of how course content has made an impact on their learning (whether positive or negative) indicates proficiency. They also have the opportunity to share the effects of unique and helpful learning experiences that were part of the class. This part of the journal entry is a valuable component for the teacher as students share their challenges and concerns. Students can also be encouraged to share their questions regarding any aspect of the learning experience.

Submission Schedules

My practice has been to require journals for every unit (eight units in all) of each online course. Since online courses generally have a course map or weekly routine such as reading/viewing and listening to the lecture, responding to forums, and turning in written assignments, journaling comes as a culminating activity for the week (if the class meets weekly). For some courses, I require journal entries to be uploaded before the start of the next class period, so classes that meet twice weekly will upload two journal entries per week. The syllabus includes the due dates for each unit journal submission. I require between half a page and a full page (single-spaced) for each journal entry.

Provide Timely Feedback

Challenges with journaling include the following: (1) the time required for reading and responding to entries with appropriate written feedback; (2) students viewing journaling as a time-consuming burden, and (3) the teacher's exasperation at having to invest large amounts of time that should be used for class preparation, especially in larger classes.

For example, I recently had 41 graduate students in a twice-weekly Web-enhanced course. Reading and responding to 82 journals per week (twice weekly) was indeed a huge task. For this reason, a short turnaround period is my target. Generally, I respond before the next class period or weekly unit. In other words, for a face-to-face or Web-enhanced class, journal responses are given before the next class period (twice per week). For the online courses, I respond before the start of the next unit (weekly). Instructors of large online classes could assign graduate teaching assistants to assist with providing feedback. The learning-management system Moodle provides a convenient space on the platform for each journal entry. Prompt teacher response has obvious benefits such as students receiving clarification in a timely manner, and having someone who

actively listens to their writing voice and responds promptly.

Knowing that the instructor will read and respond is a major incentive for student engagement. Williams et al. noted that online student engagement increased with high teacher engagement. In this instance, engagement was identified as posting to the online forum.[9] When students see that the teacher is engaged and active within the online forum, they are more likely to do likewise. For the teacher, knowing whether or not students understand the concepts being taught is essential for success. E-journal entries provide this type of data, enabling the teacher to make better decisions about how to proceed with instruction.

Confidentiality

Students should be informed about how their journal entries will be used and the degree to which they will be kept confidential. I follow the practice of private journal entries where drop boxes are provided for each unit/day of classes. Students are informed that I (the instructor) and my graduate assistants will be the primary readers of their journals. This practice helps ensure more open and personal sharing of content, reflections, and ideas. If the content of these journals is to be used as part of program and/or teacher-evaluation data collection, then students should be informed of this possibility in the syllabus. Instructors should also make students aware that postings about self-harm or harm to someone else will not be kept confidential but will be reported to the designated authorities determined by the institution, whether counselors, social workers, law enforcement, and/or administrators. (See "Administrative Essentials for Online Programs" by Janine Lim in the January-March 2018 issue.)

Using an E-Journal Template

Providing a journaling template can be helpful to students. The template identifies the essentials of the assignment, such as the identity of the student, the name of the course (as multiple courses can cause confusion), and what should be included in the text. The journal outline also could include questions and prompts to help students reflect on how they will use the ideas in their own classrooms in the future (if used in an education class); how the content relates to previous knowledge; or to discuss difficulties in grasping the concepts taught and ask for help. I use e-journals as a way to communicate with my students and to evaluate how the course is progressing. An example of the template used in my courses is provided in Box 1.

Box 1. Sample E-Journal Entry Template.

Name Journal Entry#
Course Date

What have you learned in this unit?

*Write about at least **two** ideas you learned or found interesting in this unit.* (2 points)

What would you like improved?

*Identify and describe at least **two** things you wish to improve personally or in the course. You may also choose to post any questions or concerns.* (2 points)

Assessing Journal Entries

How to (or whether to) assess journals has been a perplexing question. I have followed the recommendation that journal entries should not be assessed.[10] Instead, students are given credit for completing the entry. I usually give four points for each journal entry if the online class meets once per week. Entries submitted to the Web-enhanced course (which meets twice per week) receive two points per entry, for a total of four per week. Each submission is carefully read and feedback is sent to the student. The rubric is used mainly to evaluate the completeness and depth of the entry rather than to just indicate that it was submitted. Whether the journal is formally assessed or not, several guidelines can be helpful to instructors. English (2001), English and Gillen (2001), Kerka (2002), and Yuan and Kim (2014) offer these helpful guidelines for instructors[11]:

1. *Treat each student's submissions respectfully.* This includes ensuring confidentiality while setting clear boundaries. If students write something that is disturbing or share their intent to harm themselves or others, this crosses a boundary. Report it according to the school's policies. Online programs should have in place protocols for meeting the needs of distance and online students. Make use of professional resources available on your campus such as counselors, social workers, and/or administrators to provide the student with help.

2. *Be fair*. Provide impartial and unbiased feedback. Strive to maintain this tone when responding to every entry, even hostile ones;

3. *Focus on learning*. The journal is not intended to be a therapeutic tool; it is for learning, so help students learn the difference by providing clear prompts and questions to which they must respond, and showing them how the rubric will be used to assess their entries;

4. *Engage in self-reflection*. Practice the same level of awareness you require of the students when providing responses to their e-journal submissions and when implementing their suggestions for improving the course;

5. *Provide clear expectations and guidelines* in order to avoid misunderstandings.

Preventing and Dealing With Cyberbullying

In an online environment there is always the possibility of cyberbullying—hostile communication that can

Box 2. Cyberbullying in Online Classrooms

Eskey, Taylor, and Eskey studied factors that influence aggression toward faculty in online classrooms. In the fall 2013 semester, they contacted 550 online instructors at a liberal-arts college in the midwestern United States with a 49-question survey. Full-time and adjunct faculty respondents submitted voluntary responses. Of the 202 online faculty respondents, 103 were males and 99 were females. Collectively, this group had taught online for at least two years. In the study, respondents defined cyberbullying "as the use of electronic devices such as computers, iPads, cell phones, or other devices to send or post text or images intended to hurt, intimidate, or embarrass another person."* These types of behaviors included:

- Flaming: Using angry, hostile, or vulgar language in electronic messages to instigate online fights;
- Harassment and stalking: Sending and resending cruel or threatening messages. Resending typically takes place when instructors do not react immediately—either because they are not prepared for the attack or they don't know where to go to get help;
- Mobbing: Sending threatening, vicious messages, as a group, to a specific instructor.

Tips for Faculty and Administrators

1. Cyberbullying is against the law in many locations. Some countries have high penalties for cyberbullying, others have medium-to-low penalties. Check legislation for the country in which you live.
2. School policies should include prohibitions against cyberbullying. Make sure your school has a policy in place that includes cyberbullying and other forms of intimidation, and include it in your syllabus.
3. Cyberbullying policies should be shared and readily available. Make sure regular online and adjunct faculty know where to go for help.
4. Share anti-bullying information through Webinars and professional-development training.

* Michael T. Eskey, Cathy L. Taylor, and Michael T. Esky, Jr., "Cyber-bullying in the Online Classroom: Instructor Perceptions of Aggressive Student Behavior," *Online Journal of Distance Learning Administration* 17:4 (Winter 2014). Available from https://www.westga.edu/~distance/ojdla/winter174/eskey_taylor_eskey174.html.

occur in the absence of face-to-face communication. Online bullying may take several forms and can be directed not only to peers in the class, but also toward instructors in the form of threats, harassment, stalking, and mobbing (see Box 2).

Online instructors may be bullied if one or more students don't like their teaching style or question their credentials; bullying may also occur if the instructor lacks experience and does not respond to students in a reasonable amount of time, or even if the course material is deemed excessively challenging; bullying could occur because of grades, textbook selections, and any manner of student perceptions relating to the class or school policies. Online bullying can also escalate into physical violence against those being targeted.[12] Online users may express their confusion or dissatisfaction in a variety of ways, including insults, verbal hostility, name calling, and other undesirable responses, including threats, especially when sensitive or controversial topics are being discussed.

Flaming and cyberbullying in an online course are far less likely when students can use journaling to share their concerns in a timely manner. The confidential nature of the journaling experience allows the instructor to respond directly to the student's concern and to clear up misconceptions.

Rewards and Joys of E-Journaling

My experiences with student reflection journals in Web-enhanced and online courses has been rewarding. My rapport with students has been enhanced because the journals enable them to express confidentially their reactions to course content. They can share personal or private concerns and propose solutions. Thus, I receive prompt feedback on what is working well and what needs to be improved, and can also provide students with rapid feedback (no more than 48 hours).

Since most of my students are from the field of education, journaling tends to continue in their classes when they teach. The best reward for them as beginning teachers, and for me as their supervising instructor, however, is learning what is working well in both the classrooms in which they teach, as well as in my course. Through these reflective comments, both my students and I get a chance

to improve the teaching and learning process in our classes. Here are some snippets of journal entries from my graduate students in the instructional models and research classes:

- "I liked the activity in our [online] devotional, because even though we live in this wonderful place, and we can spend much time with our Creator, it is possible to forget Him and spend a lot of time in our academic activities, and we need to do that. However the most important thing in our life needs to be our relationship with God."
- "The microteaching I did for this class was the TABA Inductive [named for Hilda Taba]. I initially wanted to do CA [concept attainment] strategy because it is fun and I think it encourages students to participate. However, I think for smaller classes, such as in my microteaching for this day, the full potential of CA strategy will not be attained."
- "I have learned the four domains of teaching responsibility in this unit. I think it is similar to the four components of effective instruction. I also learned the pedagogical issues that are worthy of my attention. I am especially interested in learner characteristics. I just want to probe deeper into this issue."
- "I have a question about my research paper [in another class]; can I mention some practices, methods or strategies that I observed in your classes?"

In this age of technology, teachers have an opportunity to enhance student learning through e-journaling. Though the experiences shared here are in the context of higher education, the applications shared can be adapted to fit other levels of learners as well. ✎

This article has been peer reviewed.

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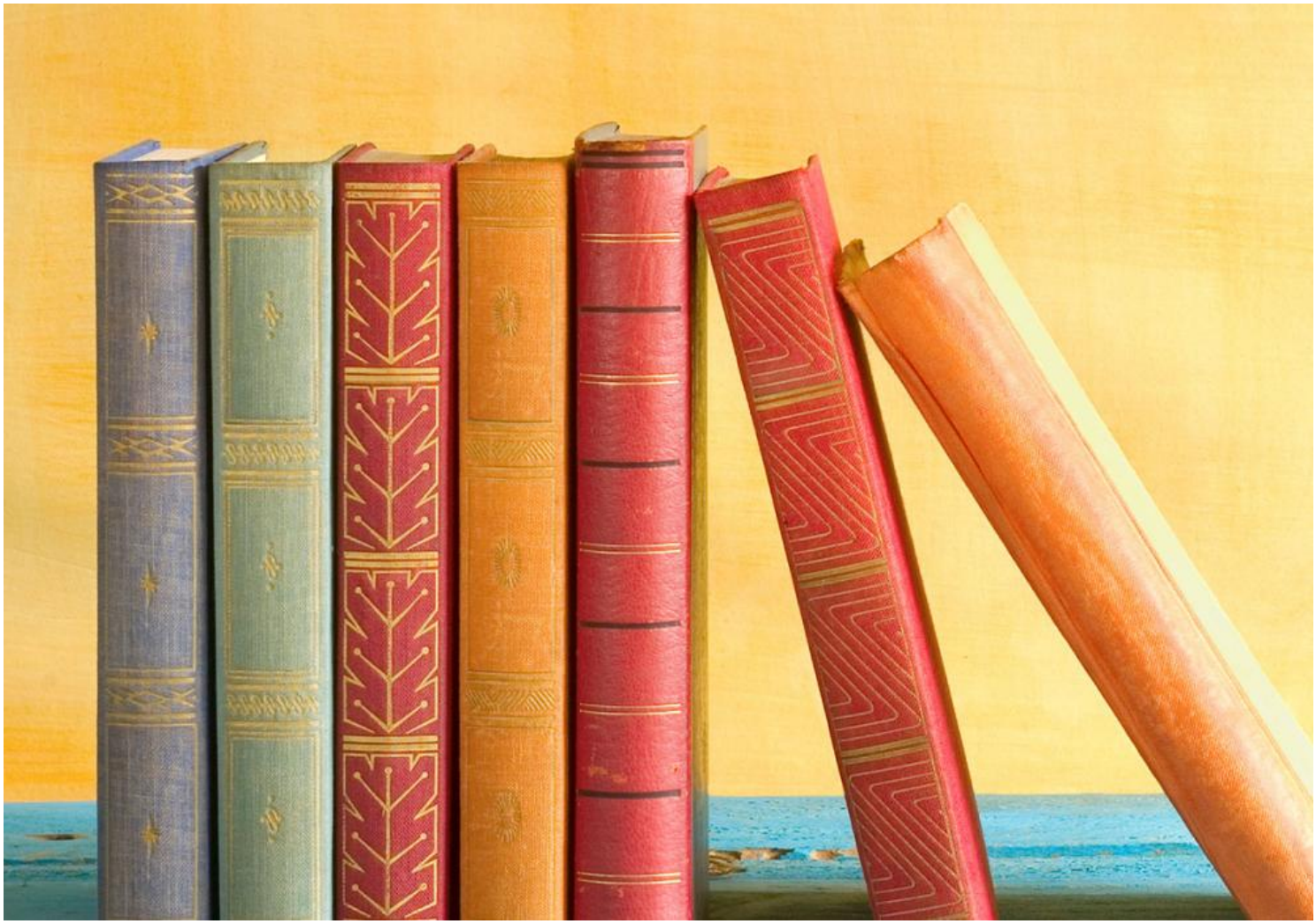

According to higher education pedagogy expert Maryellen Weimer, "most faculty do not read a lot of pedagogical material. We are not expected to grow our pedagogical knowledge the same way we are expected to keep current in our fields."[1] Thus, teacher development in higher education requires a track of its own. In the spring of 2015, a staff member at Andrews University (Berrien Springs, Michigan, U.S.A.), Anita Gonzalez, recognized this need and inaugurated the Faculty Book Club (FBC), a group that meets three times per semester to share a meal at the cafeteria and discuss a book on some aspect of higher education pedagogy. Participants also share their own teaching experiences and exchange advice and feedback with their colleagues. No reports are required from the participants at the end of FBC, as the group currently focuses on developing opportunities for dialogue.

FBCs are a type of Faculty Learning Community (FLC). The research on the effects of

FLCs has been overwhelmingly positive. They create connections and networks for isolated teachers, foster multidisciplinary curricula, and help construct community in higher education.[2] In addition, FLCs are an effective process by which educators gain insight into their practices and grow in their teaching ability, faculty cohesion, student retention, and satisfaction.[3]

FLCs have increased faculty interest in teaching and increased use of effective pedagogy, improved student learning outcomes, and assisted in promoting the scholarship of teaching.[4] We (the authors) side with Parker Palmer who, in *The Courage to Teach*, stated that "the growth of any craft depends on shared practice and honest dialogue among the people who do it. We grow by trial and error, to be sure—but our willingness to try, and fail, as individuals is severely limited when we are not supported by a community that encourages such risk."[5]

As an institution new to formalized processes of support for faculty in their teaching responsibilities, Andrews University has had to find ways to provide ongoing, sustainable, and high-impact practices—within a limited budget. Since its first semester, the book club has grown, and has operated at or near its budgeted capacity of 30 members for several semesters. The leadership of FBC transferred to the director for the Center for Teaching and Learning Excellence, Anneris Coria-Navia, in the fall of 2016, and in the spring of 2017, professors Coria-Navia and Scott Moncrieff, from the Department of English, collaborated in qualitative research to assess the effectiveness of FBC in promoting self-reflection about teaching and changes in teaching practice.

During the first year, Gonzalez, Moncrieff, and Coria-Navia facilitated Andrews' FBC in fall and spring. Starting in the second year, faculty from different departments were invited to facilitate. Our current practice is that facilitators create discussion questions via Google Docs. The discussion questions serve as a springboard for conversation, but participants can discuss other topics related to the assigned reading. Faculty have begun sending recommendations of books they want to read in FBC, and we select the books based on these recommendations.

An average of 25 faculty have voluntarily registered for FBC each semester via EventBrite (an online platform that allows individuals to plan and promote events). The director of the Center for Teaching and Learning delivers the book free of charge to the registered faculty, and an e-mail list is created through EventBrite for announcements. Faculty attend the club on the designated day and participate in the discussion. We offer three sessions on the same day, with an assigned leader for each group, and faculty can attend whichever session best fits their schedule, including switching groups on a particular day if necessary. The discussions take place at the cafeteria, where a free meal is

day if necessary. The discussions take place at the cafeteria, where a free meal is provided to the participants. We alternate holding the sessions on Mondays in the fall and Thursdays in the spring in order to facilitate different teaching schedules.
A fuller discussion of our research is presented in an article that is in process, but it will suffice to say here that FBC has made a substantial positive impact on its participants in terms of how they think about teaching as well as actual classroom practice. It was also clear from our interviews with participants that without a formal accountability and engagement structure such as an FBC, professors are much less likely to read books related to the pedagogy of teaching. The institution's cost for this professional-development activity is relatively small, approximately $45 per faculty member per semester for the book and three meals, a modest investment compared to the encouraging outcomes reported by the participants. We believe FBC represents one good model of ongoing and sustainable teaching support for faculty.

In the remainder of this article, we present brief descriptions and personal reflections on the books we have used for FBC, in the hope that this will inspire other institutions without an FBC to consider implementing one, and to also give educators who are interested in effective teaching a list of excellent books to consider reading. Although we are discussing these books in a higher education context, most of the good ideas about teaching would apply or could be adapted to a K-12 setting. See our K-12 sidebar on page 44 for further ideas in meeting the needs of this setting.

The Courage to Teach by Parker Palmer (Jossey-Bass, 1998, 2007)

The most striking aspect of Palmer's book is that he does not present pedagogical strategies for course design or everyday lessons. The principles in *The Courage to Teach* are invariably connected to the themes of identity, introspection, and community as key to the successful experience of the teacher. The chapters are built upon the underlying assumption that human relations are the most powerful and yet underutilized form of personal and professional support for educators.

Palmer explores the irony of teaching—that we form relationships with our students, but as faculty members, we typically work in isolation from one another: "Resources that could help us teach better are available from each other—if we could get access to them. But there, of course, is the rub. Academic culture builds barriers between colleagues even higher and wider than those between us and our students. These barriers come partly from the competition that keeps us fragmented by fear. But they also come from the fact that teaching is perhaps the most privatized of all the public professions."[6]

Palmer encourages readers to dig deeply into the core of who they are as individuals and teachers. The questions he asks are pertinent and relevant to the work teachers do every day, and will help them to have a developed big picture about why they teach.

A novel pedagogical principle in Palmer's book is the idea of a subject-centered education. Much like an experience that I (Anneris Coria-Navia) recently had with a colleague, who explained that we don't "cover" material in a course but rather we "uncover or discover," the idea that the subject and not the student or the teacher is at the center of education is a semantic change that has motivated me to think deeply about the big principles in the disciplines I teach. This shift is an important one, as we are constantly faced with the rhetoric and challenge at the institutional level that we should be providing a student-centered education. Palmer's book leaves the reader wanting to engage in the big questions of *why, how,* and *what* we teach. Perhaps as we ponder and attempt to answer these questions, we can turn to the support of committed colleagues for answers and the search for truth. This can be the starting point of formative, supportive dialogue among educators.

What the Best College Teachers Do by Ken Bain (Harvard University Press, 2004)

Bain researched best teacher practices at more than one hundred institutions and synthesized them in his seminal book. For instance, Bain shows how the best teachers inspire students to make a paradigm shift from learning for a grade to learning for intellectual excitement. He encourages teachers to help students discern more clearly and objectively what is exceptional artistry and scholarship, not necessarily what will earn the best grade. Bain suggests that the best professors in his studies have made a sustained, substantial, and positive influence on how students *think*, *act*, and *feel*.[7]

On a second point, for some time I (Anneris Coria-Navia) had been pondering the idea of sharing the power on the decision-making processes at the course level. Some of the questions that framed my thinking centered around who has control and who makes decisions about learning, and whether teachers should let go of the power and allow students to enter the dialogue and own the learning. Bain states that "Trust in the students also depended on the teacher's rejection of power over them. The educators we studied invited people to pursue ambitious goals and promised to help them achieve, but they left learners in control of their own education."[8] Bain also presents some principles on how this can be done. An idea that stayed with me is the syllabus language. Bain

suggests that the syllabus should be an *invitation to a feast* rather than a collection of rules and regulations. In each of my education courses, I use a small excerpt where he describes this principle and invite students to engage with me in the course design during the first two weeks of a semester-long course. Students appreciate the opportunity to provide input and feedback, and the document is enhanced by their ideas and contributions. This book offers a good combination of big ideas and practical strategies.

Leaving the Lectern: Cooperative Learning and the Critical First Days of Students Working in Groups by Dean A. McManus (Anker, 2005)

McManus recounts how transforming his pedagogical practices from lecture to cooperative learning stemmed from his being in an unhappy place.[9] Though seemingly successful at teaching and even more so as an expert in the field of oceanography, McManus did not find joy in teaching in order to barely meet the expectations of the job. Although well into his career, after a "real" conversation with students, he realized that in order for first-rate student learning to take place, he had to change the way he had structured his courses for decades.

He details the changes he made and the trials and errors of the process, all the while showing how the research on teaching and learning supported (or not) his decisions. Though largely focused on only one cooperative learning strategy (the "expert jigsaw"), the process of change and the honesty and transparency with which he approached "leaving the lectern" makes McManus's book interesting and valuable. With McManus and some of the resources he provides as a guide, an ambitious teacher could do a course redesign to take advantage of cooperative learning.

Make It Stick: The Science of Successful Learning by Peter C. Brown, Henry L Roediger III, and Mark A. McDaniel (Harvard/Belknap, 2014)

Make It Stick categorizes and summarizes numerous experimental studies about how people learn most effectively. The first chapter, "Learning Is Misunderstood," critiques some ineffective but widely used learning strategies, such as rereading and "massed practice" (doing the same thing repeatedly to build fluency). Instead, the authors argue that a more active learner role in "retrieval," such as "low-stakes quizzing and self-testing, spacing out practice, interleaving the practice of different but related topics or

testing, spacing out practice, interleaving the practice of different but related topics or skills, trying to solve a problem before being taught the solution, [and] distilling the underlying principles or rules that differentiate types of problems"[10] are all more effective and empirically tested ways of improving learning retention and improving the depth of learning.

Make It Stick should help teachers weed out ineffective classroom learning strategies and replace them with better ones. For instance, I (Scott Moncrieff) changed my quizzing strategy for my literary theory course last semester. Learning how important regular retrieval is for student learning, I never missed giving my weekly quiz. And because I was more aware of the need of students to continue reviewing previously studied material, I devoted one-third to one-half of each week's quiz to material from earlier in the semester. I also tried to regularly introduce integrative or comparative questions, to require students to synthesize current material with previous material.

It is extremely beneficial for teachers to have information about what strategies are most effective for improving student learning, so that course design can align with best practices. This improves teacher and student confidence and success. Teachers can tell students "I'm teaching this way or requiring you to do this because it is a proven way to improve your learning." *Make It Stick* is a great book for this purpose.

Small Teaching: Everyday Lessons from the Science of Learning by James Lang (Jossey-Bass, 2016)

Lang uses humor, candor, and clear language to bring to life strategies that though seemingly simple at first sight, can make a significant impact on student learning. One of the most effective aspects of Lang's approach is that most of the strategies do not require a course redesign, but rather can be integrated into tomorrow's lesson. Reading the table of contents is enough to contextualize where and to visualize how these strategies have a place in our work as educators. The title words for each chapter represent its essence—such as "Predicting," "Self-Explaining," and "Motivating."

Lang's work is closely connected with the principles discussed in *Make It Stick*. It is very helpful to read both books, and affordable. (The Kindle total for both books is less than $30.)

The last third of Lang's book focuses on inspiring students. Of particular importance is his recommendation that we focus on "infusing learning with a sense of purpose, and especially self-transcendent purpose."[11] Lang cites research showing that the "most powerful forms of purposefulness arise when students see the ability of their learning to

powerful forms of purposefulness arise when students see the ability of their learning to make the world a better place."[12]

Small Teaching influenced the way I (Anneris Coria-Navia) explain why we do things in the classroom. It helps students to know that when you are doing low-stakes quizzing two or three times per class period, it's not just to see what they don't know, but rather to assess what needs to be emphasized or relearned for long-term retention. My students have also appreciated being prompted often to think deeply about developing intrinsic motivation for learning and engaging with course materials and the world. Students have valued knowing the "why" and having strategies also that help them study better and engage more fully with the course and their peers. Lang's small changes can make a big difference in student learning.

Teaching and Christian Imagination by David I. Smith and Susan M. Felch (Eerdmans, 2016)

This book, written by professors at Calvin College, is the first explicitly Christian approach to higher education teaching we have used in FBC (Fall 2017). The authors talk about how in all fields, including science, business, etc., we constantly structure our understanding through the imagination and the use of metaphor, as in the constellation of battle imagery for "fighting" a disease. So they set out to use three capacious metaphors to frame the possibilities of teaching from a Christian perspective: going on a journey or pilgrimage, caring for a garden, and erecting a building.

Each metaphor is scrutinized in various contexts and nuances over several chapters. For instance, the pilgrimage section identifies pilgrimage or journey language we use in educational contexts, such as "covering a lot of ground," "falling behind," "staying on track," getting "stuck in a rut," and covering material "step by step,"[13] followed by discussions of the final destination or goal of the journey, the teacher's relationship to the student, the difference between tourists and pilgrims, and the relationship of each day's journey to the overall arc of the trip. Examining one's own classroom practice through all this journey language definitely helps with rethinking where one has gone and how one might like to travel differently in the future. For instance, a chapter on "What Sustains the Journey?" examines what refreshes and renews both student and teacher throughout the rigors of travel through the semester—and for the teacher, years and years of one semester after another. One of the ways my enthusiasm and interest in teaching is rekindled is from reading books like this, that ask me to deliberately think through the larger purposes of what I (Scott Moncrieff) am doing using new perspectives, and to see how those perspectives can inform what I do from class to class.

Grit: The Power of Passion and Perseverance by Angela Duckworth (Scribner, 2016)

We don't often get to read a *New York Times* bestseller for FBC, but that's the case here. Duckworth, a psychologist at the University of Pennsylvania, defines *grit* as a combination of passion and perseverance. Her numerous stories and descriptions of research studies will inspire and instruct anyone who would like to come closer to achieving his or her potential. The book is divided into three sections: "what grit is and why it matters"; "growing grit from the inside out" (i.e., on one's own); and "growing grit from the outside in" (i.e., in a team context).

Grit is useful reading in a higher education context in terms of academic advising—Chapter 8, on "Purpose," has an excellent discussion on finding and developing one's calling. But the book as a whole will also be useful in helping teachers effectively articulate to students the role that effort plays in learning and achievement. There is some significant overlap between Duckworth's "grit" and Carol Dweck's famous "growth mindset,"[14] and Duckworth explicitly builds on Dweck's foundation in her "Hope" chapter, but I (Scott Moncrieff) see the books as complementary rather than redundant.

Although the book is not explicitly Christian, it is very congenial to Christian applications. Duckworth's own passion is using "psychological science to help kids thrive,"[15] and she consistently talks about how our grit can be used not just for personal achievement, but also to benefit others. Best of all, although some people may be naturally "grittier" than others, Duckworth cites numerous examples to illustrate that all of us can increase our grit. In the week following reading the book, I have been "grittier" on two or three occasions just because I could say to myself, "Can't you show a little more grit?"

More Great Books on Teaching

Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses by L. Dee Fink (Jossey-Bass, 2013)

This is an update of Fink's well-received 2003 book and highlights backward-design course planning: starting with significant student outcomes and designing course modules and assessment from these. Fink revises Bloom's

taxonomy of learning as part of defining "significant" outcomes.

***Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom* by John C. Bean (Jossey-Bass, 2011, 2nd ed.)**

This is an update of Bean's 2001 classic and addresses how writing can aid understanding and critical thinking in any class. Bean also gives a number of helpful ideas about how teachers can streamline the feedback process while maintaining quality.

***How Learning Works: Seven Research-based Principles for Smart Teaching* by Susan A. Ambrose et al. (Jossey-Bass, 2010)**

The writers engage such crucial questions as: How does students' prior knowledge affect their learning? What factors motivate students to learn? What kinds of practice and feedback enhance learning? and How do students become self-directed learners?

***Inspired College Teaching: A Career-long Resource for Professional Growth* by Maryellen Weimer (Jossey-Bass, 2010)**

Weimer delivers principles that guide the professor as he or she engages in lifelong learning about teaching. Of special interest is her substantial treatment of an effective reflection process, "Reflection for Growth and Change," and her separate chapters addressed to the particular challenges and opportunities of new faculty, mid-career faculty, and senior faculty.

***Mindset: The New Psychology of Success* by Carol Dweck (Random House, 2006)**

Dweck's classic text differentiates between the "fixed mindset"—believing that intelligence and ability are fixed—and the "growth mindset"—believing that intelligence and ability are malleable, and the implications these two mindsets have for the ability to learn. Virtually every book on education post-2006 cites Dweck on this concept, so crucial is it to effective teacher practices.

Teaching Naked Techniques: A Practical Guide to Designing Better Classes* by José Antonio Bowen and C. Edward Watson *(Jossey-Bass, 2017)

Bowen and Watson argue that residential colleges need to capitalize on what they can do better than online education: face-to-face (i.e. "naked") interaction between faculty and students, with focus on critical thinking and active learning. Meanwhile, these authors believe that technology should be largely removed from the classroom and used to enhance learning outside the classroom. This is an update and application—with many instructive examples from teachers of different disciplines across the country—of Bowen's *Teaching Naked: How Moving Technology Out of Your College Classroom Will Improve Student Learning* (John Wiley & Sons, 2012).

***Tools for Teaching* by Barbara Gross Davis (Jossey-Bass, 2009 2nd ed.)**

This is a fairly comprehensive book for a new teacher, addressing everything from course design to diversity in the classroom to leading an effective discussion and grading. Davis adopts a terse style to cover so much ground, but the book is beautifully organized, with multiple short sections with references to further reading, so it works very well as something to pick up when you have a specific question, or as a gateway to further study.

At this point, the Faculty Book Club is a well-established program at Andrews University and it meets a definite need for faculty who want to discuss and improve their teaching and expose themselves to new and challenging ideas about how to teach better. We already have next year's (2018-2019) discussion leaders and books selected, which will focus on capitalizing on the potential strengths of diversity. In the fall, we will be reading *Disunity in Christ: Uncovering the Forces That Keep Us Apart*, by Christena Cleveland (InterVarsity Press, 2013), and in the spring, *Diversity's Promise for Higher Education: Making It Work*, by Daryl G. Smith (Johns Hopkins University Press, 2009).

Recommendations for K-12 Faculty Book Clubs

K-12 teachers typically have less schedule flexibility than teachers in a higher education setting. To implement a workable FBC, one option could be to meet first thing in the morning once or twice per month. Students would arrive at school at the regular time and be cared for by staff members in the gym or multi-purpose room. Teachers would have 45 to 60 minutes to meet as a learning community to discuss the book they are reading. This could be done as a school-wide community, by grade levels, wings, etc. If a morning time during the school day does not work, an afternoon time might be a possibility, during regular faculty meeting time. Ideally, this learning opportunity for teachers would take place during regular working hours. An online discussion group would be another option, especially for one- or two-teacher schools.

As far as K-12 pedagogical books to read, from our list we would recommend consideration of *Mindset*, *Grit*, *Make it Stick*, and *Small Teaching*. We would also recommend browsing through the Jossey-Bass catalog online, which identifies many K-12 oriented books, including *Future Wise: Educating Our Children for a Changing World* (2014) by David Perkins; and *How to Be Heard: Ten Lessons Teachers Need to Advocate for Their Students and Profession* (2017) by Celine Coggins. One of the beauties of a FBC is that each school can choose books that address the felt needs of its teachers.

This article has been peer reviewed.

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Recent years have seen incredible growth in our understanding of the molecular underpinnings of life. Technology now enables us to look deep within the cell to view the activities of individual molecules, enzymes, even individual atoms.[1] The sequencing of the human genome is old news, and we are now sequencing the genetic code of untold numbers of other biological organisms. We are nearly reaching the point at which a trip to the doctor's office will be accompanied by an analysis of our genetic code.[2] It seems that we will soon know the secret of life . . . at least, that is what some might say.

More astonishing is the rapid pace at which techniques are being developed to manipulate life as we know it. Scientists are actively pursuing the ability to replace failing organs with new organs grown directly from the person's own stem cells. The scientific world has been abuzz in recent years about a technology that will soon enable

fine edits of human DNA code to correct disease-causing mutations. We are now able to make designer genes, and researchers are working on making designer organisms—for example, mosquitoes that are unable to transmit malaria.

These developing technologies—stem-cell therapeutics, gene editing, and synthetic biology—have great implications for health care and for the stewardship of our planet. They also have great potential for abuse. Because of this, the scientific community has invested considerable effort to consider the ethical implications of these technologies, including a 2015 summit in Washington, D.C. on the emerging area of gene editing,[3] which was organized by scientific organizations from the U.S., England, and China, with nearly 500 scientists, ethicists, and other interested groups from around the world participating. The meeting concluded with a recommendation to refrain from any gene editing research on viable human embryos intended for implantation and pregnancy until ethical and safety concerns have been resolved.

In this article, I would like to consider some of these developing technologies that are now enabling us to modify life as we know it. What exactly are these biological technologies? How do they work? Will they be beneficial to us and our planet, or result in negative repercussions? Most importantly, are there biblical principles that might guide Christian communities' approach to these issues? Finally, I will discuss how to best approach these subjects in the classroom. How can we teach about these rapidly changing aspects of science while getting the science and the Bible correct and encouraging students' practical involvement in the issues?

Embryonic Stem Cells

Stem cells are unique because they are capable of both regenerating themselves and becoming, or differentiating into, new types of cells. Scientists originally thought that stem cells were found only in embryonic tissues or bone marrow, but we now know that stem cells are found in a wide variety of normal adult tissues, even in certain regions of the brain,[4] to enable continued growth and regeneration of tissues. Stem cells that grow in bone marrow, for example, are capable of regenerating the many cell types that circulate throughout the bloodstream: red blood cells, platelets, macrophages, and several types of immune cells. Stem cells found within the small intestine continually regenerate its lining as old cells age and slough off. The discovery of these cells and their ability to regenerate tissue, is thought to be a major advancement toward treating and curing disease.

While adult stem cells hold much potential, a great deal of the publicity about stem cells has centered on *embryonic* stem cells, which exhibit special properties not found in adult stem cells. It is embryonic stem cells that differentiate to form each human being, which means that they can ultimately become all the cell types of the body, a capability that is referred to as *pluripotent*. The blood stem cells mentioned above are only able to form other types of blood cells, so they are referred to as *multipotent*. The advantage of a pluripotent stem cell and the core of the hype that surrounds stem cells is that pluripotent stem cells do not limit themselves to creating a particular repertoire of cell types. Scientists may be able to use these stem cells to grow any type of cell or organ humans need. Whereas patients now must wait for an appropriate organ donor, doctors of the future might simply place an order for a replacement organ that was grown in the lab.

While the potential of these cells is exciting, embryonic stem cells are typically derived from five- to six-day-old human embryos that have been banked at fertility clinics but not used for their intended purpose. The origin of embryonic stem cells raises the concern of those who believe that life begins at conception, as the embryos from which the stem cells are harvested do not survive. Although some might argue that this concern has been "holding back the progress of science," the response of the public against embryonic stem cell use was at least partially responsible for a push within the scientific community to develop an alternative type of stem cell.

In 2006, Shinya Yamanaka's lab in Kyoto, Japan, showed that pluripotent stem cells could be derived from normal adult cells through some genetic manipulation.[5] Recent research has enabled the differentiation of many types of cells from these induced pluripotent stem cells (iPSCs), reducing the need to work with embryo-derived stem cells.[6] iPSCs, in fact, could enable the production of replacement organs from a person's own cells, thus eliminating the rejection issues when donor tissues are used in transplants. While embryonic stem cells have many unique and useful characteristics, some alternatives now exist.

Currently, few treatments using any type of stem cell have been approved by regulatory agencies, illustrating the complexity of this form of therapy and the many hurdles scientists must overcome to successfully use stem cells in transplantation therapies.[7] However, hundreds of studies are currently underway investigating the possibilities. Scientists have made some progress in using embryonic stem cells to treat macular degeneration by transplanting stem cell-derived retinal cells.[8] Similar transplant methods have been attempted in the treatment of spinal cord injury. A stem cell

methods have been attempted in the treatment of spinal-cord injury. A stem-cell treatment has recently been approved in Europe that uses a patient's own unaltered

adult stem cells to repair the cornea after injuries such as burns.[9] But perhaps the best-known stem-cell treatment has been around for more than 60 years—bone-marrow transplants, in which a donor's adult stem cells are transplanted into a recipient, often a leukemia patient, as a replacement for his or her own malfunctioning (cancerous) stem cells, all of which have first been destroyed by radiation or chemotherapy.

Three-parent Embryos

While neither embryonic stem cells nor iPSCs have made it to market as an approved therapy, the manipulation of embryonic tissue has been approved in at least some countries in the form of three-parent embryos.[10] In this case, scientists are not using embryonic cells for potential therapeutic use in an adult patient, but rather manipulating the embryo itself so that the developing individual does not inherit severe mitochondrial disease. Mitochondria are the powerhouses of the cell—small organelles that are largely responsible for converting food into usable energy. Some of the instructions for running these powerhouses come prepackaged with each mitochondrion in the form of mitochondrial DNA. Mutations in the mitochondrial DNA can sometimes result in incurable and often fatal diseases. While most of our genetic material comes from both our parents, the bulk of our mitochondria and other organelles come only from our mother through the large cytoplasm of the egg. To produce a three-parent embryo, the nucleus of an egg with faulty mitochondrial DNA is transplanted into a de-nucleated donor egg with normal mitochondria. This manipulated egg is then fertilized by sperm in the lab and implanted into the mother's uterus. The individual resulting from this process would have genetic information from three parents—two mothers and a father.

This mitochondrial replacement therapy has been approved for use in fertility clinics in Britain.[11] Although it has not yet been approved in the Unites States, experts are urging the United States Food and Drug Administration (FDA) to approve its use in clinical trials. There are, of course, some unknowns: Might there be some detrimental effect of having third-party genetic material in cells? Could there be a psychological impact on the child of having a third parent? What if the procedure doesn't work? What if the defective mitochondria are somehow transferred over and retained? This possibility has been demonstrated, suggesting that we must be very careful as we approach these kinds of manipulations.[12] Questions aside, it is likely that this therapy will be approved in other countries in the near future. Recently, news has arrived that a three-parent baby was born in April of 2016 in Mexico.[13] We have arrived at this point, whether we like it or not.

Beginning a Discussion: Some Ideas for Teachers

While many of the topics in this article deal with complicated biological and ethical issues, they are rooted in basic biology and biblical study and provide an opportunity to demonstrate the relationship between the two. Here are some ideas for considering these topics in a variety of classrooms:

• ***In the upper elementary/junior high classroom (grades 6-8):*** This is the age at which students are beginning to develop their independence and are becoming aware of current issues. They may not be prepared to deal with ambiguous questions, but are certainly interested in issues such as fairness, the value of life, and the unique talents of each individual. These topics can be addressed from both biblical and biological points of view through the lens of current issues and family relationships. For example, a discussion of the value of each human being might begin with the story of the widow's mite, followed by consideration of how we all have value—even, and especially—those who may be disabled in some way. This might lead to consideration of the accomplishments of handicapped people throughout history, gene editing, and the value we place on specific traits. A consideration of talents immediately brings to mind the parable of the talents, as well as Paul's description of the variety of spiritual gifts in the church. This naturally leads to the biological basis of many differences we see in other people and the issue of who is "normal." Elementary teachers who feel unprepared to discuss the topics discussed here could invite a guest speaker who has considered these topics in more detail; for example, a local medical doctor or academy science teacher.

• ***At the secondary/high school level (grades 9-12):*** Secondary students have increased abilities to think in abstract ways and to reason through complex problems. In addition, many are rapidly approaching (maybe even reaching) the age at which they can drive and vote, and thus are likely to be interested in current events. They may be reticent to express their opinions for fear of being embarrassed. To break the ice, use a short game to introduce the subject and get them talking. UNESCO's online book, *Moral Games for Teaching Bioethics*[1] has a number of useful ideas for stimulating student discussion. These games might be used to introduce a subject or to follow up a science presentation to encourage students to grapple with principles in areas where there are often no black-and-white answers. Current events in the news, such as the idea of three-parent embryos, are sure to engage secondary students. Since these issues often come with very personal and/or political opinions, students need to be taught how to identify reliable sources online in the course of doing research. A homework assignment might ask students to engage their parents on these issues, using some specific and directed questions.

• ***For college/university courses:*** The above ideas can be adapted for college-level

For college/university courses: The above ideas can be adapted for college-level classes as well. However, college students need to deal with ambiguous situations as they prepare for the "real world" and will benefit from being required to think through and research a variety of situations. Case studies involving real medical dilemmas are widely available and are great resources for stimulating the thinking of college students.[2] These can be followed up by a debate in which students are required to argue the merits of one side of an issue and/or create a reflection in writing. Students in the bioethics class at Andrews University (Berrien Springs, Michigan, U.S.A.) have sometimes commented on how useful such activities are in preparation for things such as medical school admissions interviews. Developing the ability to think through such issues is sure to be useful for many students; a course at the general-studies level will likely take a similar approach, but delve into the scientific details to a lesser extent than a capstone or majors course. Further, for students enrolled in healthcare or genetics-related programs, seminars and workshops by experts in these topics would provide opportunities for them to understand and learn to navigate these topics.

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Gene Editing

Mitochondrial replacement therapy has a relatively small market—people with defects in their mitochondrial DNA. However, nearly all disease has a genetic basis. That is, most diseases are caused by either an inherited or an acquired change in the DNA code, so a technology that could reverse those changes would have a huge impact in curing and preventing disease. Just such a gene editing technology has emerged in recent years. The technology is called CRISPR/Cas9, an acronym that describes a bacterial immune system.[14] Just as humans have to fight off viral infections, so do bacteria. Bacteria do this by incorporating a piece of the viral genetic material into their own DNA, then using this as a template to recognize other invading viruses, which are then chopped up by the Cas9 bacterial enzyme. Scientists have now adapted this system for use in mammalian cells such as our own. In fact, you might say that scientists have made this system even

cells such as our own. In fact, you might say that scientists have made this system even

"better" by making subtle changes that improve the precision of the cutting mechanism, and by manipulating the mechanism to be used in many ways that include not just cutting, but also subtle editing of the genetic material.[15]

Will this technology be used in therapeutic ways to solve human disease? Companies are already lining up with great expectations for CRISPR technology. Two companies in particular have garnered substantial funds for the effort. Editas, based in Cambridge, Massachusetts, and backed by Bill Gates and others to the tune of US$120 million, has the goal of using this technology in at least five human clinical trials by 2022, hoping to eventually cure diseases such as Duchenne muscular dystrophy and cystic fibrosis. CRISPR Therapeutics, also based in Cambridge, Massachusetts, has brokered deals with Bayer (US$335 million) and Vertex Pharmaceuticals (US$105 million) to develop the technology to treat conditions such as blood disorders, blindness, and congenital heart disease.[16]

There is every likelihood that this technology will produce results in the near future. Its effectiveness has already been shown in animal models. In 2014, a mouse with a mutation in the dystrophin gene, which typically leads to the development of muscular dystrophy in mice, was treated with CRISPR technology, which halted the development of the disease.[17] Its use in humans was initiated in the summer of 2015, to a loud outcry from the international scientific and bioethics communities, as scientists in China revealed the possibility of using this technology in nonviable human embryos.[18] More recently, the technique was used to modify immune cells from a patient with lung cancer, with the hope of stimulating the immune system to attack the cancer, and in viable human embryos that were not implanted, to successfully correct a defect leading to hypertrophic cardiomyopathy.[19]

Gene editing has gone past the editing of humans to achieve better health to the editing of mosquitos to try to accomplish their demise (and to improve our health). Mosquitoes were targeted because they transmit many serious diseases, including dengue fever, malaria, and zika virus. Scientists have developed a method to manipulate the mosquito's genetic material in order to block pathogen transmission.[20] In addition, a method of rapidly disseminating this trait throughout the entire wild population has been developed using a "gene drive." The most dramatic version of this approach eliminates all male mosquitos, effectively causing a crash in mosquito populations (no males, no reproduction). While this technology is currently locked up in secure labs, it may eventually be used.

Synthetic Biology

Related to the idea of gene editing is the concept of synthetic biology—making new organisms and species that can do what we want them to do. This is not a new concept. In fact, the biotechnology industry began with this revolutionary idea, that we can manipulate organisms (initially just bacteria) to produce things useful to humanity. Genentech was a pioneer in this area, using genetically engineered bacteria to produce insulin for the treatment of diabetes.[21] Many diabetics are currently the beneficiaries of this bacterially produced human insulin, or Humulin®.

Today, however, we can not only engineer bacteria to do simple tasks, but are also able to dramatically alter the makeup of organisms. The implications of this kind of manipulation of nature are wide-ranging. For example, a group of scientists recently inserted more than 20 foreign genes into a strain of yeast to enable it to produce opioids.[22] Currently, the production of drugs like morphine relies on the volatile international supply of poppies; a reliable supply of these crucial pain drugs would be beneficial. However, the apparent ease of opioid production from yeast has led some to speculate on the potential for abuse if the technology falls into the wrong hands.

Some years ago, a team of scientists at the J. Craig Venter Institute artificially synthesized an entire bacterial genome, describing the feat as the "Creation of a Bacterial Cell Controlled by a Chemically Synthesized Genome."[23] Although the scientists didn't actually create a cell, but rather just inserted a chemically synthesized version of a bacterial genome into a cell in which the DNA had been removed, this still raised a controversial question: Might humans be able to synthesize life? Another research team led by Craig Venter has recently created a new species of bacterium with a genetic code smaller than anything known in nature.[24]

The future will surely hold many new feats of biological prowess, from the engineering of cells with new chemical production capabilities to the development of entirely new synthetic organisms with completely unique genetic circuits to do what is currently unimaginable. Many of these technologies and products will certainly be beneficial and lead to future improvements in our quality of life. Some of these products will challenge us to probe more deeply the ethical and moral principles guiding our lives.

Biblical Principles

Each of these technologies for gene and cell editing holds great promise for the control of disease and the correction of previously incurable genetic diseases. Each also presents many ethical issues and potential for misuse, and forces us to consider carefully a

many ethical issues and potential for misuse, and forces us to consider carefully a number of questions, such as: (1) Is it ethical to use human embryos in research? (2) Is it

appropriate to genetically modify human cells to treat disease? (3) How do we define "disease"? (4) Do we have the right to genetically modify the germ line (reproductive cells) of species, particularly our own species?

> Jesus, the Great Physician, commanded His disciples to go out and heal every disease (Matthew 10:1). The apostles were agents of healing and miracles in the early days of the church (Acts 5:16), and God has given His people through the ages many gifts, including the gift of healing (1 Corinthians 12:28), which has been considered the "right arm" of the Seventh-day Adventist Church since its early days.

While the Bible doesn't say much about modern molecular biology and genetics, it certainly has plenty to say about life and health and about the Creator and the creation. Let's consider what the Bible has to say.

1. *Is it ethical to use human embryos in research?* This could be a situation in which God brings good out of the less than ideal. God is an expert in this. We might think of Paul in prison in Philippi, where a bad situation for Paul turned into good for the jailer, who became a believer (Acts 16:1-40). Or what about Solomon, considered the wisest man who ever lived, who was the product of a relationship that began with murder and adultery (2 Samuel 12:1-31)?

It is unlikely that God intended embryos to be stored in fertility clinics. It is, however, likely that He can bring good out of the situation. There are several options for dealing with the more than 600,000 embryos estimated to be in cryogenic storage in the United States alone[25]: (a) leave them in the freezer; (b) implant them in the owner or donate them to other hopeful parents; (c) donate them to research; or (d) destroy them. There seems to be little difference between leaving them frozen or destroying them, as those left frozen are bound to be destroyed or deteriorate eventually. Donating them to other parents seems noble and a way for these embryos to fulfill their potential, although there would seem to be a greater need in our world for parents to adopt the born rather than the unborn.

2. *Is it appropriate to genetically modify human cells to treat disease?* Jesus, the Great Physician, commanded His disciples to go out and heal every disease (Matthew 10:1). The apostles were agents of healing and miracles in the early days of the church (Acts 5:16),

apostles were agents of healing and miracles in the early days of the church (Acts 5:16), and God has given His people through the ages many gifts, including the gift of healing

(1 Corinthians 12:28), which has been considered the "right arm" of the Seventh-day Adventist Church[26] since its early days. James wrote in James 2:16: "If one of you says to them, 'Go in peace; keep warm and well fed,' but does nothing about their physical needs, what good is it?"[27] In like manner, if one has the means to fix a genetic disease, or to replace a degenerated organ, but does nothing about it, what good is it? Who among us would be willing to tell a parent of a child with Tay-Sachs disease, for example, that we are able to cure your child's disease, but sorry, we will not, because that would be "playing God?" That is exactly the kind of "playing God" that God asked of us, when He sent out the disciples, apostles, and each of us as ministers to the world to heal hurting people both spiritually and physically.[28]

3. *How do we define "disease"?* This may be the most difficult question to discuss, and can get us into some sticky territory. For example, while Tay-Sachs disease and cystic fibrosis are genetic diseases that cause untold suffering and would benefit immensely from a cure, most personality traits and superficial characteristics also have a genetic basis, although often more complex, and so also have the potential to be modified through developing genetic techniques. There are many cases where a characteristic might be considered abnormal by some, but normal by others. Most of us would consider deafness to be a problem. However, members of the deaf community have their own language and culture and consider their deafness to be a difference rather than a disease to be cured.[29]

This issue of differentiating normal from abnormal is maybe the greatest challenge of a gene editing age. The Bible may help us in some areas, although certainly not in all. Paul suggests in Romans 12:2 that normal in this world is not to be desired: "Do not conform to the pattern of this world, but be transformed by the renewing of your mind." Many verses in Scripture declare that our normal inclination is not what God desires, but with God's help we can become a "peculiar people" (1 Peter 2:9, KJV) abnormal in the eyes of the world.

In another context, Paul presents a list of those individuals who we might consider abnormal, who will not inherit the kingdom of God (1 Corinthians 6:9-11). It rapidly becomes apparent that normal or abnormal is based on one's point of view. The Bible gives us some indication of what is good; what, in the context of the kingdom of God, should be considered normal. However, our understanding is at best imperfect, and the parable of the wheat and the tares indicates that it is not our role to separate the good from the bad.

History provides examples of what has happened when humans tried to separate normal from abnormal, the wheat from the tares, so to speak. In the early 20th century, the eugenics movement[30] tried to weed out the bad genes from the good. This resulted in the forced sterilization of individuals diagnosed as being "feeble-minded" or "insane." Many of these individuals, if they were alive today, would likely be productive members of society, if not "normal" in the typical sense of the word. In his book, *The Gene: An Intimate History*, Siddhartha Mukherjee concludes that abnormal is whatever doesn't match the current environment, and that as the environment changes, different characteristics are considered abnormal.[31] For example, Attention Deficit Hyperactivity Disorder (ADHD) is considered abnormal in most contexts of our current far-too-sedentary world. However, distraction and hyperactivity in the context of a hunter-gatherer society might be considered a strength. It is clear that we must tread softly where clarity is lacking, but heal quickly where diseases are clearly debilitating.

4. Is it our right to genetically modify the germ line of species, particularly our own species? Heritable changes have the potential to fundamentally change who we are as a species and the makeup of ecological communities on our planet. Is it appropriate to be involved in creation to this extent, and if so, who gets to make the decisions? Are we stepping outside of our bounds when we involve ourselves in this kind of "playing God"?

The Bible is clear that humanity has a certain level of responsibility for what happens on this planet. God created the heavens and the earth, and commanded human beings to "'rule over the fish in the sea and the birds in the sky . . . and over all the creatures that move along the ground'" (Genesis 1:26). God wished for the prosperity of the earth and wanted humankind to be central to that prosperity. David reiterated this sentiment: "'You made them rulers over the works of your hands; you put everything under their feet'" (Psalm 8:6). These texts suggest that God intended human beings to have mastery over all of creation as an extension of God's authority, to care for the earth, to serve as stewards of the planet.

As stewards of this planet, our actions must show both care for humanity and care for the entire web of life on the Earth. For just as our bodies are temples of the Holy Spirit (1 Corinthians 6:19), so also is the Earth "the Lord's, and everything in it" (Psalm 24:1). God cares for even the sparrow (Luke 12:6), and provided a means for the land to have a Sabbath year of rest (Leviticus 25:2-5; Exodus 23:10, 11). He even commanded humans not to pollute the Earth, because it is His home, too! "'"Do not pollute the land where you are . . . . Do not defile the land where you live, and where I dwell, for I, the LORD, dwell among the Israelites'"" (Numbers 35:33, 34).[32] Clearly, our stewardship of this

dwell among the Israelites'" (Numbers 35:33, 34).[32] Clearly, our stewardship of this planet comes with great responsibility.

We care for our planet because it is God's creation. But it is certainly not the perfect Earth that God made in the beginning, having undergone many mutations due to the ravages of sin. We await the time when we will be made new, according to God's original plan. While we assume that this will fully occur at the Second Coming, Jesus suggested that the kingdom of God was both yet to come and in the present: "'The kingdom of God is in the midst of you,'" He said in Luke 17:21. Could it be that our ability to fix the effects of sin to a degree, through medical advances including those described here, can in a small way bring "the kingdom of God" to us in the here and now?[33]

Could it be that God has given us the opportunity to relieve some of the groans of creation (Romans 8:22) through our abilities to prevent disease, impart pest resistance, increase food production, and replace degenerated organs? Jesus relieved suffering and healed people throughout His ministry, and with each healing proclaimed the good news of the kingdom (Matthew 4:23; Luke 10:9). One might imagine that as Jesus healed the blind and the paralyzed, that He was performing some divine genetic engineering, just a small taste of the change that will occur "in the twinkling of an eye" at His second coming (1 Corinthians 15:52).

The challenges that we face as a human race that can do so much damage scientifically are largely based on our greed and arrogance. While we work to improve human life, we must ensure that we are not responsible for the demise of the species with which we share our planet. This is our responsibility as stewards (Revelation 11:18). Currently we are doing a poor job of this, mostly because we do such a good job of exploiting the resources of the planet for our own benefit. Since we are witnessing the extinction of species at an unprecedented rate, I have strong concerns regarding the elimination, for example, of mosquitos for the benefit of humanity. How many more species will we choose to eliminate for our benefit? What might be the repercussions to the food web or the entire ecosystem? Is it possible to manage our resources using all the technologies at our disposal in ways that benefit humanity as well as the whole of Planet Earth?

A Classroom Approach

The discussion above makes it clear that our understanding of the fundamentals of life is growing by leaps and bounds. Biology, specifically genetics, affects each one of us personally in our health and family histories. It also impacts our communities and countries by improving our quality of life and driving large segments of the economy, and affects our relationships with our world and our Creator as we understand the

effects we have on the environment. While these topics are clearly relevant to life today, the dramatic changes in biology make it difficult to stay abreast of the latest

developments, let alone understand how they fit into a biblical worldview.

The Scriptures present general principles that may help us to navigate through difficult issues. For example, one of these principles is *love*, the central commandment found in the Bible (Matthew 22:37-40). Our relationship with God should encompass a compassion for our fellow human beings and the beasts of the field. This concern for the well-being of all of life, not just humanity, should inform our decisions in difficult areas of biology.

Another principle that should guide our thoughts in these areas is *humility* (2 Chronicles 7:14). When we understand our place in the world from a biblical perspective, we cannot help but be humble. Additionally, the Bible commands us to focus on truth (or the Truth), and states that we can understand some parts of truth through the various faculties provided us, including our human reason (Isaiah 1:18).

Certainly our young people are interested in the truth. Moreover, they are interested in being involved in the issues being debated as we search for truth. Discoveries in biology and genetics will be a central part of the world in which they grow up. It is important that we become involved in the world as it exists today, and we need to encourage our young people (and older ones as well) to be involved in the issues that will affect them, their descendants, and the environment. Many of our students will become leaders in science and technology, so we have a responsibility to engage with them to discuss how our faith and the principles of the Bible intersect with their interests, with the progression of science for the benefit of humankind, and the implications of scientific discoveries that have the potential to harm the Earth and its inhabitants. As they do so, they may discover new truths in God's Word and new examples of God's leading in all aspects of life.

Some resources exist to help us in this search for understanding. The Christian View of Human Life Committee, commissioned by the Seventh-day Adventist Church, produced two excellent documents in an attempt to clarify our relationship to genetic engineering technologies. Although the first was produced in 1995, more than 20 years ago, the

principles outlined therein remain pertinent to the issues at stake today. The second, produced in 2000, focused on human gene therapy, with similar principles presented.[34]

In addition to these documents, Adventist higher education institutions address bioethics at a number of levels. For example, some of our undergraduate institutions offer classes dealing with many bioethical issues, and Loma Linda University (Loma Linda, California, U.S.A.) supports a Center for Christian Bioethics with a focus on biomedical ethics, a Master's degree in bioethics, and a recently initiated annual conference on Adventist Bioethics in Healthcare.

For teachers who may not have access to these university resources, it is important to engage with these topics and teach our young people the best information that is available. This can be done through in-service education, online courses, and research. When we don't know the answer, and in some cases we never will, the best way to approach these issues in the classroom is to present what we do know, and then encourage discussion. We can clarify areas where we have information, both biblical and scientific. We can guide students toward using Christian perspective to think critically, identify bias and hidden agendas, and analyze the quality of various sources they will encounter.

And, ultimately, we remain humbled by what we don't know. In recent years, I have come to know an organization called The Colossian Forum,[35] whose goal is to facilitate difficult discussions, often in areas where there are many opinions and no clear consensus. While there may never be a clear consensus on some issues, the central idea is that it is beneficial to travel the road together as a community with differing opinions, that it offers an opportunity to practice Christian grace, and that ultimately all things hold together in Christ (Colossians 1:17). We can have confidence that God can see the end and will guide us along the way.

This article has been peer reviewed.

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NOTES AND REFERENCES

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4. For a scientific review of neural stem-cell growth and function, see Y. Mu et al., "Signaling in Adult Neurogenesis," *Current Opinion in Neurobiology* 20:4 (August 2010): 416-423. The U.S. National Institutes of Health maintains an online primer on stem cells, including adult stem cells, which can be found at https://stemcells.nih.gov/info/basics.htm. (https://stemcells.nih.gov/info/basics.htm.)
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17. Chengzu Long et al., "Prevention of Muscular Dystrophy in Mice by CRISPR/Cas9-mediated Editing of Germline DNA," *Science* 345:6201 (September 2014): 1184-1188.

18. Puping Liang et al., "CRISPR/Cas9-mediated Gene Editing in Human Tripronuclear Zygotes," *Protein Cell* 6:5 (April 2015): 363-372.

19. David Cyranoski, "CRISPR Gene-editing Tested in a Person for the First Time," *Nature* **539**:7630 (November 2016): 479; and Hong Ma et al., "Correction of a Pathogenic Gene Mutation in Human Embryos," *Nature* 548:7668 (August 2017): 413-419.

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21. An excellent description of the role of Genentech in this new field can be found in Sally Smith Hughes, *Genentech: The Beginnings of Biotech* (Chicago: University of Chicago Press, 2011).

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24. Ibid.; Clyde A. Hutchison III et al., "Design and Synthesis of a Minimal Bacterial Genome," *Science* 351:6280 (March 2016): aad6253. doi: 10.1126/science.aad6253.

25. Embryos are usually frozen by fertility clinics by the early blastocyst stage, at which time they contain about 200 to 300 cells. To be clear, I do not think God is in favor of freezing human pre-embryos for the sole purpose of scientific research. However, I believe that this is rarely the motivation for harvesting them. I do think that if there is a moral issue here, it is with the fertility industry, not with the research enterprise; U.S. Department of Health and Human Services, "Embryo Adoption," (August 2017): https://www.hhs.gov/opa/about-opa/embryo-adoption/index.html. (https://www.hhs.gov/opa/about-opa/embryo-adoption/index.html.)

26. Ellen White refers to medical missionary work, which includes health, as the "right arm" of the third angel's message in Ellen G. White, *Counsels on Health* (Mountain View, Calif.: Pacific Press, 1923), 331.

27. Unless otherwise indicated, all Bible texts in this article are quoted from the New International Version. Holy Bible, New International Version®, NIV® Copyright © 1973, 1978, 1984, 2011 by Biblica, Inc.® (http://www.biblica.com/) Used by permission. All rights reserved worldwide.

28. Of course, God's healing would be perfect healing, whereas our technologies are likely to contain imperfections. There are always unknown consequences to any treatment, due to our imperfect understanding, which the medical and regulatory communities aim to reduce as much as possible.

29. See M. McKee et al., "Ethical Issues in Conducting Research With Deaf Populations," *American Journal of Public Health* (2013) 103:12: 2174-2178 for comments on deaf culture and the threat of genetic engineering to their culture. A recent issue of *National Geographic* (January 2017) focused on genetic issues relating to gender.

30. The eugenics movement called for mandatory sterilization laws that would prevent people with hereditary diseases from passing traits onto their offspring. Scientists at that time had basic knowledge of the gene unit and its role in inheritance, but did not fully understand how genes worked or could be manipulated. For this reason, they sought to eradicate diseases such as hereditary blindness, insanity, epilepsy, syphilis, alcoholism, and more through sterilization; and, along with sponsored Race Betterment Conferences, promoted the concept of creating and preserving a master race. See Edwin Black, *War Against the Weak: Eugenics and America's Campaign to Create a Master Race* (Washington, D.C.: Dialog Press, 2003), 152, 317.

31. Siddhartha Mukherjee, *The Gene: An Intimate History* (New York: Scribner, 2016).
32. I may be stretching the meaning of this text a little, as the pollution being referred to here is "bloodshed"—murder. However, one might argue that pollution leads to much bloodshed, both human and animal, just in a more indirect way.
33. This is not to say that God's kingdom is not yet to come, but that we can experience a little bit of it while still here on Earth. We will never cure humanity of its worst condition, that of "heart" disease: greed, jealousy, hatred.
34. "Christian Principles for Genetic Interventions" (June 13, 1995): https://www.adventist.org/en/information/official-statements/documents/article/go/-/christian-principles-for-genetic-interventions/ (https://www.adventist.org/en/information/official-statements/documents/article/go/-/christian-principles-for-genetic-interventions/) and "Human Gene Therapy" (April 01, 2000): https://www.adventist.org/en/information/official-statements/documents/article/go/-/human-gene-therapy/, (https://www.adventist.org/en/information/official-statements/documents/article/go/-/human-gene-therapy/,) are both found on the official Website of the Seventh-day Adventist Church. These documents present a balanced view of scientific developments at the time they were prepared and appropriate Christian responses to them. The statements assert that relieving human suffering is an important Christian responsibility and consider a number of relevant biblical principles, but leave many questions unanswered. They do recommend that heritable genetic changes should not be made. I suggest that this was easier to say when the technology did not exist, but not as clear now that the technology is becoming available.
35. The Colossian Forum: http://colossianforum.org/. (http://colossianforum.org/.)