A Glimpse of the World through the Eyes of a Professor in Computer Science

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Abstract

As a professor of a Seventh-day Adventist (SDA) university, I believe that it is mandatory to have a strong Weltanschauung. As a result, it will be possible to transmit my worldview, which combines faith and science, to my students. In this paper, I present my Weltanschauung as a computer scientist from four dimensions: 1) a computer scientist as a reformer, 2) a computer scientist as a mentor, 3) a computer scientist as a researcher, and 4) a computer scientist as a strategic dynamo in the SDA Church. Although I come from a SDA family, I studied in a SDA school, and I am an active church member, my higher education and professional background are very secular. Therefore, the reflections presented in this paper are key to strengthen my Weltanschauung as a Christian professor. I hope that my conclusions can be helpful to experts and practitioners in my area.

Short Bio

I am a professor at the School of Engineering and Technology, Universidad de Montemorelos, Mexico. I hold a Ph.D. in Computer Science from Universitat Politècnica de València (Spain), a MSc in Information and Communication Technology from Assumption University (Thailand), and a BSc in Computer Science Engineering from Universidad EAFIT (Colombia). My research interests include Services Computing, Model-Driven Engineering, Models at Runtime, Autonomic Computing, and Dynamic Software Product Lines. I have contributed to publications in top international conferences

(such as SPLC, ECOWS, MODELS, and ICWS), journals, and book chapters. I have worked in universities, information technology (IT) companies, and research groups on four continents (America, Asia, Australia, and Europe).

Introduction

My life is the result of a sequence of key events. Some may say things happen as the result of mere chance. However, it is my belief events are designed with a purpose.

My interest in software design is not new. It all started when I was a kid and my parents used to encourage my brother and I to design sophisticated artifacts with Lego blocks. As a result, both of us focused our Ph.D. theses on software modeling. Also, we work in areas related to Model-driven Engineering in academia.

My interest in software engineering research has been a quest on four continents. This journey started as a research assistant at the university where I studied computer science engineering in my country, Colombia. Since that time, research has opened my mind to wonderful new perspectives in science and industry. Then, I moved to Asia where I started working as a lecturer at Asia-Pacific International University, a Seventh-day Adventist institution with a vibrant international environment. The influence of several colleagues and master's professors, and the impact of research and technology in Asia increased my passion for research. My first research publications saw light at that time.

After working in different positions in Asia and as a sessional lecturer for Avondale College in Australia, I went to work as a lecturer for undergraduate and graduate software engineering courses at Universidad de Montemorelos, Mexico.

I hold a Ph.D. in computer science from Universitat Politècnica de València, Spain. This university is ranked among the thirty top universities in the engineering area in the world. I decided to carry out doctoral studies when I realized the great need of computer scientists

in SDA universities. Moreover, I noticed that our Church needs computer science scholars in order to guide IT decisions that impact the organization.

Although I have had the privilege to work in three SDA universities, my higher-education background is secular. Unlike most of my SDA colleagues, who have studied at SDA universities, I have not had the opportunity to take courses related to Christian Weltanschauung. Now, as a professor at Universidad de Montemorelos, I find it mandatory for myself to express my own Weltanschauung. In turn, I will transmit this worldview to my students. Moreover, a strong Weltanschauung is a must to witness to non-Adventist computer scientists.

In this paper, I describe my Weltanschauung as a professor in computer science from four complementary dimensions. Although my view of the world is composed of more dimensions, I decided to focus on the ones that are related to my job as an educator. The covered dimensions are supported by the Bible and the Spirit of Prophecy.

Although my higher-education background is non-Adventist, I come from a SDA family. In fact, my father is a pastor and my mother is a primary school teacher. Therefore, I have been involved in church's activities since my childhood. This religious environment have helped me to build the dimensions of my Weltanschauung.

The remainder of this paper is organized as follows. In Section I, I present how I see the world as a technological reformer. In Section II, I present how I see the world as a mentor. In Section III, I present how I see the world as a researcher. In Section IV, I present how I see the world as a strategic dynamo in the SDA Church. In Section V, I present conclusions.

1. A Computer Scientist as a Reformer

It is amazing to read about the achievements made by the pioneers of the Protestant

Reformation, heroes of faith, who defended their beliefs even in the darkest and most challenging times. They fought spiritual battles in order to bring light to the lives of many who had hunger of Truth.

Today, even though we have easy access to information on the Internet, TV, and other media, there are still so many who do not know about the beauty of the Adventist message while drowning in a sea of misinformation. This fact calls for an urgent action to use IT to reach non-Adventists. Moreover, I believe that IT should be strengthen as an strategic asset inside the SDA Church. In my experience, I have realized that IT departments in several divisions are mainly focused on supporting daily operations; not on a strategic role. In my opinion, this situation calls for internal actions in the Church.

In this context, I believe that I have been called to be a technology reformer who 1) reaches others with technology and 2) strengthens the Church with strategic IT plans. Instead of conforming to current patters, a reformer goes a step forward with new solutions (even disruptive ones). As a result, I develop IT projects in the Church no matter limitations.

In this section, I present three aspects found in the lives of Nehemiah, a tremendous leader, and three early reformers, Martin Luther, William Tyndale and John Knox, that have inspired my mission as a reformer:

1. The first aspect that is found in religious leaders is a *daily communion with God*, which is full of prayer and study of the scriptures. Let us recall Nehemiah. When he heard that his brethren had a great affliction, the wall of Jerusalem was broken down, and the gates were burned with fire, he prayed before God for this situation, not just for a day, but during "certain days" (Nehemiah 1:4). He also prayed before talking to the king Artaxerxes (Nehemiah 2:4), under conspiracy (Nehemiah 4:9), and in times of distress (Nehemiah 5:19).

   Just as Nehemiah, Luther dedicated long hours in prayer (Bainton, 1995). During

the Diet of Worms, an important milestone in the history of the Reformation, “the light of Heaven illuminated his countenance” (White, 1947). This fact recalls the case of Stephen (Acts 6:15).

John Knox, a Scottish clergyman and leader of the Protestant Reformation, was also a man of prayer. Writing about Knox, Ellen G. White mentions: “Thus he kept to his purpose, praying and fighting the battles of the Lord, until Scotland was free” (White, 1947).

The key principle maintained by early reformers “was the divine authority and sufficiency of the sacred Scriptures” (White, 1947), as testified by Luther's words at the Diet of Worms: “I am bound by the Scriptures I have quoted and my conscience is captive to the Word of God” (Brecht, 1996).

As a technology reformer, I continually ask myself: Do I have a life of prayer? Have I offered my technology talents to God in prayer so He can use them? Have I asked God to give me the opportunities and resources to help His Church with IT projects? How much time do I spend studying the Bible daily?

2. The second aspect in the lives of spiritual leaders is *passion to accomplish an important task*. Every spiritual leader has something important to accomplish: Nehemiah was called to restore Jerusalem, Luther initiated the Protestant Reformation, Tyndale translated the Bible into English, and Knox led the Protestant Reformation in Scotland.

   These reformers work with a great passion to fulfill what God had put in their minds, no matter persecution or death. Nehemiah led vigorously the reconstruction of the walls of Jerusalem and carried out many reforms in Judea, despite opposition. Luther was an “ardent and zealous, fearless and bold, in reproving sin and advocating the truth. He cared not for wicked men or devils; he knew that he

had One with him mightier than they all" (White, 1947). Tyndale replied to an angry Catholic doctor, "I defy the Pope, and all his laws; and if God spares my life, ere many years, I will cause the boy that drives the plow to know more of the Scriptures than thou dost!" (Wansbrough, n.d.; Foxe, 1761). John Knox "feared not the face of man. The fires of martyrdom, blazing around him, served only to quicken his zeal to greater intensity. With the tyrant's ax held menacingly over his head, he stood his ground, striking sturdy blows on the right hand and on the left, to demolish idolatry" (White, 1947).

Inspired by such examples of passion for a mission, I carry out projects to support the SDA Church with technology and to fulfill The Great Commission (Matthew 28:16-20). In this sense, I consider myself a light in the world. In fact, a city that is set on a hill cannot be hidden. Nor do they light a lamp and put it under a basket, but on a lampstand, and it gives light to all who are in the house. Therefore, I let my light shine before men (Matthew 5:14-16).

3. The third aspect is the *right preparation to fulfill objectives*. For centuries, God has provided special training to spiritual leaders. Let us recall the case of Moses who was educated in the best Egyptian schools. Daniel was brought to the king's palace to learn the language and literature of the Babylonians. Nehemiah had the preparation to be in an influential position where he could work in favor of his people. Luther was a Doctor of Theology, Tyndale studied at Oxford University and at the University of Cambridge, and Knox studied at the University of St. Andrews.

   I have followed the example of these leaders by reaching higher standards in my education. Moreover, as a computer scientist, I am eager to learn about technologies, methodologies, and tools to find optimal solutions to real problems. I am sure that God can give me more academic opportunities as soon as I use the talents He has given me (Matthew 25:14-30).

2. A Computer Scientist as a Mentor

Sometime ago, I was browsing the Internet when I found a very interesting website for young people named “Pope to You” (Pontifical Council for Social Communications, 2009). On this site, visitors can find the latest news about Pope Francis, a Facebook application to hear his words, see photos and receive his messages, watch videos on YouTube and follow his activities in the world through iPhone and iPod Touch.

It is a fact that we are living in a world of daily technological changes that even affect the way we live religion. It is the time that Daniel prophesied about: “But you, Daniel, shut up the words, and seal the book until the time of the end; many shall run to and fro, and knowledge shall increase” (Daniel 12:4). Why the people are running to and fro? The Bible answers: “'Behold, the days are coming,' says the Lord GOD, that I will send a famine on the land, not a famine of bread, nor a thirst for water, but of hearing the words of the LORD.” (Amos 8:11). As a Christian professor in computer science, my main objective is to be a mentor who guides young disciples to use technology as a powerful way to reach people who need to know about the message of salvation.

According to The Third Annual Media Convergence Forum (The Economist, 2009), technology is changing the world in several ways: over 1,000,000 books are published worldwide every year; a Google Book Search scanner can digitize 1,000 pages every hour. American have access to 1,000,000,000,000 web pages and 65,000 iPhone apps. Newspaper circulation is down 7 million over the last 25 years, but in the last 5 years, unique readers of online newspapers are up 30 million. In 2009 traditional advertising declined but digital advertising grew rapidly. The number of unique visitors to ABC, NBC and CBS get every month, collectively is 10 million; the number of unique visitors to mySpace, YouTube, and Facebook get every month, collectively is 250 million. The average American teen sends an average of 2,272 text messages per month. Nokia manufactures 13 cell phones every second. 93% of U.S. adults own a cell phone.

Based on the aforementioned facts, I ask myself: What can my students do to use technology to support the Adventist mission? How can they shake the world with technology such as Paul and Silas did at their time (Acts 16:20)? Some ideas that I try to transmit to my students (or disciples) are presented as follows:

1. I ask my disciples to pray to receive the Holy Spirit in order to empower the Adventist mission with technology. I tell them to remember that the power, which came from heaven to the disciples in the Day of Pentecost (Acts 2:1-4), was the engine to move them to preach to thousands and to make great miracles.

2. Second, I tell my disciples that God can use any technological skill they have and convert it into something great. Just like in the miracle of feeding 5,000 people with five loaves and two fish, "God often uses the simplest means to accomplish the greatest results" (White, 1898).

3. I ask my disciples to work together. Two (or more) heads think better than one. I ask them to create teams of Adventist experts and practitioners to share ideas and work together in common international projects.

4. I encourage my disciples to develop technology-related courses in SDA churches and schools. As a result, they will teach our pastors and teachers how to use cheap technologies with a high positive impact, such as blogs, podcasts, and free software (Free Software Foundation, 2000).

5. I ask my disciples to create free and open source technologies for SDA schools, universities, churches, hospitals, etc. In these projects, I encourage them to work as a team in order to avoid the problem of "reinventing the wheel" (in order to avoid building technological projects that have already been created somewhere else).

In my courses, I tell my students that this is the right time for them to take advantage of

technology to support the mission of the Church. Revelations 18:1, 2 warns us of an spiritual polarization. The bad will be extremely bad and the good extremely good. Just like Pr. Mark Finley said at the Global Adventist Internet Network (GAiN) forum 2009, we are in the middle of a cosmic battle for the domain of our minds. As a result, I ask my disciples: Are we going to lift up Jesus from the earth using technology (John 12:32)? Are we going to impact the world joining our technological skills and knowledge to the service of God, just like a candle in the middle of the darkness (Matthew 5:14)? Time is close to the end and also our opportunity as Adventist technologists (1 Corinthians 13:8).

3. A Computer Scientist as a Researcher

As a researcher, I have carried out research projects and published my results in several relevant international scenarios. I believe that research is a must in order to reach a high standard among other universities in Mexico. Moreover, I believe that it is important to carry out research projects to solve current problems in the SDA Church and to help humanity (see examples in my previous research: Alférez, 2010; Soto and Alférez, 2009a; Núñez and Alférez, 2010; Sánchez, Hernández, and Alférez, 2010; Soto and Alférez, 2009b).

I do not limit the potential of our research projects at Universidad de Montemorelos. In fact, our professors and students have the knowledge, tools, and determination to carry out excellent research projects. Moreover, I believe that research is a very powerful witnessing tool. In my case, I enjoy sharing the Gospel with colleagues in conferences around the world where I present my research. It is easier to reach and teach Bible concepts to scientific minds when you are at their same level. In this way, research opens the doors to have access to scientific communities.

At the metalevel, I try to connect the ideas presented in my courses and research on naturalistic observations. As a result, I achieve two objectives: 1) demonstrate that several computational concepts, such as artificial neural networks, try to imitate God's creation,

which is much more complex and sublime (Psalms 19); and 2) show solutions as lifelike as possible in order to explain abstract computational concepts in an easier way.

The following paragraphs illustrate how I perceive computer science through nature. Specifically, I describe this worldview in my research area on autonomic service compositions.

- In nature, adaptation contributes to the survival of individuals to cope with the weather, enemies, or any hazards. For example, bears hibernate in the winter and possums play dead to avoid predators. As organisms live in intricate, changing environments, Web service compositions are executed in complex, heterogeneous and highly-intertwined computing infrastructures in which a diversity of events may arise. Thus, it is desirable to translate the ideas of adaptation in the natural world to service compositions in order to solve these situations. In my research, I introduce a model-driven approach to achieve autonomic Web service compositions that can self-adjust according to situations in the computing infrastructure.

- Biologist Howard Berg at Harvard describes the bacterial flagellar motor as a "nanotechnological marvel" (Berg, 2003). This motor has no more than 50 nanometers (nm) in diameter and spins clockwise or counterclockwise at speeds on the order of 100 hertz (Hz). Flagella receive feedback from the context and can self-adjust their course in response to external stimuli. The flagellar motor has numerous proteins involved in its function. If just one of these proteins is taken away, either the flagellum is not produced, or it does not function at all. As the bacterial flagellum exhibits remarkable intelligent design, I argue that self-adaptive systems have to be designed first in order to accomplish a particular task at runtime.

- The pupillary light reflex is an adaptation mechanism, which automatically adjusts the amount of light that reaches the retina. Greater intensity light causes the pupil to

become smaller, whereas lower intensity light causes the pupil to become larger (Purves et al., 2008). As organisms and organs count on autonomic adaptation mechanisms, I argue that service compositions require a supporting computing infrastructure to face context events during execution. In my research, I propose an infrastructure to detect changes in the context and enable the dynamic adaptation and the dynamic evolution of the service composition by leveraging the models that are created at design time.

- The New Caledonian Crow is a tool-using species of crow, which are able to make hooks (Hunt, 1996). Without tools, it will be difficult for them to find the most profitable prey to survive (i.e., to adapt in the environment). These crows use different plant material for creating hooks. Each type of tools is used in different ways, for instance to grasp food in a narrow hole or to reach food in a difficult place. As the New Caledonian Crow uses tools to adapt to its environment, I argue that tools are required to allow service compositions to adapt to their context. In my research, these tools are used to model the autonomic behavior and to leverage models at runtime to guide dynamic adjustments.

4. A Computer Scientist as a Strategic Dynamo in the SDA Church

During the last years, there has been an increasing interest in technology-related topics in the SDA Church. Evidence of this is the increasing number of events where communicators and technologists meet to discuss new ways to use technology to share the Gospel. Some of these events are international (such as GAiN), while others are focused on particular divisions and conferences. Moreover, a good number of articles with suggestive titles, such as “Cyber Geeks and Jesus” (Murray, 2007), make evident the hunger for technology in the Church. Also, Adventist News Network (ANN) has empowered the use of social media and technology with an interesting segment on a weekly video magazine.

The aforementioned facts are not isolated. Elder Ted Wilson said: “There are many plans

we are currently working on that have to do with large-scale evangelistic activity, a massive use of media integration, a convergence of every possible kind of media usage, including television, radio, Internet, publishing, and other media outlets within the church." (Satelmajer and Hucks II, 2011). Amid this technological boom, a question arises: What is my role as a computer scientist to support technology in our Church? In order to answer this question, first I describe a framework in which communication and IT are positioned in our organization. Then, it will be easy to identify what has been done and what needs to be solved in the future. Imagine this framework as a four-wheel wagon. The two front wheels represent communication and the two rear wheels represent IT. Each wheel illustrates the following dimensions:

- **Dimension of communication use:** This dimension is about using traditional (e.g. radio and TV) and new ways (e.g. the Internet) to communicate the Gospel. Well-established communication departments in all levels of our organization enrich this dimension. In this dimension, I look for attractive and pedagogical ways to teach pastors and church members to use the latest and most effective technologies. For instance, I encourage the use of Massive Open Online Courses (MOOCs) to teach them how to do Internet evangelism. In some of my previous projects, I have demonstrated that basic concepts can be taught with simple and innovative ways such as cartoons[1] and short video clips[2].

- **Dimension of communication development:** This dimension is about developing effective communication strategies. For example, successful campaigns have been developed in this dimension to position hashtags, such as #RBHW, as a trend topic in Twitter. In this dimension, I emphasize the creation of more mass communication strategies. These strategies can be cheap - for example, using social media, which is visible to millions.

1 http://goanimate.com/user/0o27xutr2mlQ
2 http://vimeo.com/user15809177

- **Dimension of IT use:** This dimension supports daily tasks with computing infrastructures (e.g. servers, networks, etc.). The software that we use in daily activities (e.g. word processors and accounting software) are also in this dimension. As mentioned before, I have realized that IT departments in different divisions and conferences mainly focus on IT maintenance and rarely play a strategic role. In my opinion, the next step is to consider IT departments as strategic assets. To this end, I encourage my disciples and management at different levels of the organization to move from focusing only on IT maintenance into a more strategic role.

- **Dimension of IT development:** This dimension is about developing strategic technologies to support the Adventist mission. Although some divisions already have strategic IT departments, most of them do not. The following simple question can help us to understand the current panorama of this dimension: How many applications in Apple Store have been developed by Adventist IT departments to reach the postmodern society? The answer is, not so many. I believe that IT departments should be motivated to use the best methodologies and tools to create technologies to invigorate the Adventist mission and our institutions (for example, for reducing costs). Furthermore, knowledge and resources should flow fluently among IT departments around the world. In this way, they will help and learn from each other.

Traditionally, the focus has been on communication and IT usage-related dimensions. Although these dimensions should be strengthened, more emphasis needs to be put on the development of communication strategies and technologies. As there are communication departments in every division, I encourage leveraging IT departments to a more strategic position. In addition, Adventist universities should be encouraged to train communication and IT departments and help them develop strategies to support the Adventist mission.

Although we have taken significant steps, there is a lot to be done, specially in the

dimension of IT development. As a result, I focus my work as a computer scientist in this dimension. As a wagon cannot go forward with a missing wheel, the aforementioned dimensions cannot work in isolation; they have to work together in symmetry to preach the Gospel, help the needy, and support our institutions.

Conclusions

In this paper, I presented my Weltanschauung as a professor in computer science from four dimensions: 1) a computer scientist as a reformer, 2) a computer scientist as a mentor, 3) a computer scientist as a researcher, and 4) a computer scientist as a strategic dynamo in the SDA Church. The reflections in this paper have helped me to reinforce my Weltanschauung as a Christian professor.

Ellen G. White says: “We are living in the most solemn period of this world’s history. The destiny of earth’s teeming multitudes is about to be decided. Our own future well-being and also the salvation of other souls depend upon the course which we now pursue. We need to be guided by the Spirit of truth. Every follower of Christ should earnestly inquire: 'Lord, what wilt Thou have me to do?'” (White, 1858). In the four dimensions of my professional Weltanschauung, I try to do my best to answer this question every day. I do not have a moment to lose to support the Church by applying my knowledge in computer science and by encouraging my disciples to do the same.

As a technology reformer, I try to be brave, passionate, and hardworking. I consider myself as a co-worker with God in a world that needs me: “the harvest is plentiful but the workers are few. Ask the Lord of the harvest, therefore, to send out workers into his harvest field” (Matthew 9:37, 38).

As a mentor, I invite my disciples to use their talents to support God's mission. I tell them that God came to rescue humanity, just as the good Samaritan (Luke 10:25-37). We are the innkeepers who has been given technological resources and talents to help others (Matthew

25:14-30). Based on the fact that our existence is very short in this life and our purpose goes beyond this world, I invite them to ask themselves: What should be your purpose in life? I ask them to answer this existential question based on Christ's purpose: “For the Son of Man came to seek and to save what was lost” (Luke 19:10). Not to be served but to serve (Matthew 20:28).

As a researcher, I consider urgent and vital to leverage research in SDA universities. In fact, science and technology as we know them today will be removed shortly (1 Corinthians 13:8). Thus, we must make the most now in order to support the Adventist mission and help humanity with technology.

As a strategic technological dynamo in our Church, I am working as a computer scientist in IT development. As an international organization, my projects cover different levels of the SDA Church. In my daily labor, I remember the following words: “Christ made full provision for the prosecution of the work entrusted to the disciples, and took upon Himself the responsibility of its success. So long as they obeyed His word, and worked in connection with Him, they could not fail. Go to all nations, He bade them. Go to the farthest part of the habitable globe, but know that My presence will be there. Labor in faith and confidence, for the time will never come when I will forsake you.” (White, 1948).

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