

Developing Mathematicians: The Benefits of Weaving Spiritual and Disciplinary Discipleship

Patrick Eggleton (Taylor University)



Patrick Eggleton (B.S., M.Ed., University of South Florida; Ph.D., University of Georgia, all in area of mathematics education) serves as a Professor of Mathematics at Taylor University where he teaches mathematics and prepares future mathematics teachers. His interests focus on instructional strategies that emphasize active learning and reasoning, and in developing future mathematics teachers with a similar focus.

1 Introduction

Driving down the interstate in the early 2000s, I came upon a billboard advertising a Christian university with a single word – Discipleship. To be honest, I was quite impressed by that one-word explanation of this school’s mission. Discipleship conjures an image of emerging adults engaging with mentors, to grow and learn through experiences, instruction, and reflection. While this mission is certainly commensurate with an emphasis on the faith development organized through chapel, campus life activities, and scriptural instruction, there is an implication that discipleship is equally at the heart of courses where students learn coding languages and integration techniques among the many other aspects of instruction ascribed to the university. Parks states, “Faith is often linked exclusively to belief, particularly religious belief. But faith goes far beyond religious belief, narrowly understood. Faith is more adequately recognized as *the activity of seeking and discovering meaning in the most comprehensive dimensions of our experience.*” [12, p. 10] The mission of discipleship is a mission of faith development – a mission of meaning-making – and it is intricately weaved through every aspect of an emerging adult’s development. James K. Smith suggests that the development of an individual’s faith in God occurs primarily through the routines, rituals, and culture of the person’s experience that seeps into their heart and transforms their identity. In this paper I explore how a similar process of routines, rituals, and culture are used to develop each student’s disciplinary “faith” and how these processes complement each other.

2 Spiritual Discipleship

Most students choose a Christian university because they believe that somehow they will develop more of the faith that God calls them to exhibit into all aspects of their lives, including their vocations. It is not clear how this faith development will occur. For most, we believe that the combination of the campus culture, the interactions within the community, and the instruction in the classroom will somehow bring about faith development – and it will – to some degree or another. Our faith does not remain stagnant and our interactions with our environment affect our faith, for good or for bad. A university committed to biblical faith development seeks for students to develop the faith that is already manifest in their lives to grow closer and closer to the ideal faith encouraged by Jesus. This type of faith development requires intentional discipleship – much like the discipleship demonstrated by Jesus within the gospels.

“One of the most crucial things to appreciate about Christian formation is that it happens over time. It is not fostered by events or experience; real formation cannot be effected by actions that are merely episodic. There must be a rhythm and a regularity to formative practices in order for them to sink in—in order for them to seep into our *kardia* and begin to be effectively inscribed in who we are, directing our passion to the kingdom of God and thus disposing us to action that reflects such a desire.” [14, p. 226] Jesus modeled this rhythm and regularity of formative practices in his teaching of the first disciples. First, Jesus served as a role model of faith and directed the attention of the twelve to others who modeled faith well, such as the Roman officer described in Luke 7 whose faith was praised by Jesus because he knew that just a word from Jesus would bring healing to his servant. The faith formation that Jesus provided also included a regularity of events and experiences that directed the passion of the twelve toward the kingdom of God. They witnessed miracles attributed to faith. They shared truths heard from Jesus and performed miracles. They also had experiences of faith, like Peter’s walking on water, and challenges to their faith in the demand to take up a cross and follow. Jesus practiced a regularity of Sabbath study of the scriptures in the synagogue and participation in sacred observances, while also providing faith events and experiences that were a part of their daily existence.

Discipleship is a focus at many Christian universities. Where I teach, (Taylor University) spiritual discipleship has a regularity of formative practices. Some of these are more liturgical and systematic, like chapel services provided three times a week and the intentionality of most of the dorms sitting together over meal times. The chapel services expose students to role models in the faith, often sharing how faith has shaped the speaker’s vocational life as well as their personal life. The “intentional community” demonstrated in one way through the dorm wing dining practices allows these emerging adults a venue for experiencing the messiness of relationships while haphazardly exploring practical outcomes of a faith-focused life. Other campus liturgies occur as opportunities are available, much like many of the lessons for Jesus’s twelve. The campus emphasis on servanthood, while symbolically modeled at the beginning (the welcoming of freshmen to the campus) and end (graduation) of each school year with the Taylor towel, permeates the atmosphere in and out of the classroom through discussions and actions that continue to point the community toward the ideal of faith desired. Another less formal discipleship emphasis is in the development of leaders marked with passion. Much like Jesus sharing His passion for the Father and for His creation as He walked alongside His disciples, leaders at Taylor, both from the staff and emerging within the student body, share a passion for ministering love and truth within this community and beyond. These practices, among others, characterize a discipleship at Taylor that is much like the discipleship that Jesus offered His twelve. As summed up by the 2026 strategic direction, “the essence of the Taylor discipleship experience is . . . something woven into the fabric of our culture – the right kind of students having the right kinds of interactions with the right kind of faculty.” [15, p. 10]

3 Disciplinary Discipleship

I would contend that an emphasis on spiritual discipleship at a Christian university can pervade the instructional practices of the Christian university faculty member. Those faculty members who weave their personal faith development with their disciplinary development provide a type of disciplinary discipleship for students emerging in those fields. Much like James K. Smith shared regarding spiritual formation, development within the discipline requires an education of more than the facts and procedures related to the given specialty. Exemplary education provides a discipleship within the discipline that seeps into the *kardia*, providing individuals with an opportunity to

express their God-given unique gifts with a broader, life-encompassing emphasis. While what I call disciplinary discipleship is not necessarily unique to faith-based schools, the discipleship methods for developing the heart growth of faith are similar to the methods needed to develop the *kardia* connection within a discipline.

To better characterize this idea of disciplinary discipleship we can look at the journey of one of my former students through his preparation to become a mathematics teacher. Ken participated in a study designed to observe and analyze the development of emerging mathematics teachers [5]. These emerging teachers were enrolled in a program that sought to promote their ability to teach mathematics as described by the *Curriculum and Evaluation Standards for School Mathematics* that had been developed by the National Council of Teachers of Mathematics (NCTM) in 1989. The mathematics emphasized within this framework goes beyond the typical emphasis of mathematics computations and procedures to include what has been called “mathematical power” [9, p. 205], “mathematical proficiency” [11, p. 5], and more recently “mathematical practices” [10, p. 7].

Strategic competence (i.e., the ability to formulate, represent, and solve mathematical problems) and adaptive reasoning (i.e., the capacity to think logically and to justify one’s thinking) reflect the need for students to develop mathematical ways of thinking as a basis for solving mathematics problems that they may encounter in real life, as well as within mathematics and other disciplines [10, p. 7].

While most preparing mathematics teachers have excellent computational and procedural skills in mathematics, few have developed the more life-encompassing emphasis that is the goal of the more experienced community of mathematics teachers. Ken was observed in classes and student teaching, interviewed, and his course artifacts were analyzed over the last two years of his college experience, allowing a unique opportunity to note any affects from what I am calling disciplinary discipleship.

Ken was very gifted in mathematics, yet he struggled to see how mathematical ways of thinking provide a cognitive foundation for the strategic competencies and adaptive reasoning needed for problems encountered in life. The small advances Ken made over the 1.5 years of the program occurred due to what I would now call the discipleship aspects of the program. Although he was resistant to any changes in his formulaic view of mathematics, the regularity of experiencing, exploring, and reflecting on alternative views toward mathematics helped him open up to what he called a “deeper understanding of mathematics” [5, p. 98]. In an interview with Ken toward the end of his program, he shared about changes in his thinking and how those changes were connected to his experiences within the mathematics methods class. In the interview he shared how prior to the class his emphasis for students was to memorize procedures. At the end of his program he now saw daily, creative problem solving as a more ideal method of teaching mathematics.

The brief disciplinary discipleship he experienced within his mathematics teaching methods course allowed him to experience modeling of a broader emphasis in mathematics. He regularly met with mathematical experiences where he had to formulate, represent, and solve mathematical problems and where he had to think logically and justify his thinking. The "liturgies" advocated for future mathematicians and experienced by Ken in his methods courses are summed up by the "Mathematical Practices" in the Common Core State Standards: 1-Make sense of problems and persevere in solving them, 2-Reason abstractly and quantitatively, 3-Construct viable arguments and critique the reasoning of others, 4-Model with mathematics, 5-Use appropriate tools strategically, 6-Attend

to precision, 7-Look for and make use of structure, and 8-Look for and express regularity in repeated reasoning [4]. For example, he worked with others to develop regular patterns related to measurements taken with a viewing tube while adjusting distance from an object observed or the length of the tube. His group had to work together to provide firm justifications for the conclusions that they developed. His disciplinary discipleship also occurred through readings. In an interview related to his reading of mathematical power shared by the National Council of Teachers of Mathematics [9], Ken shared that this emphasis on mathematics provides a "deeper" understanding of mathematics. He shared that a "perfect world" would be characterized by students able to develop mathematical power [5, p. 98].

Having experiences where he had to formulate and solve problems and taking time to reflect on alternative views of mathematics provided a type of disciplinary discipleship for Ken. The discipleship-like influences that Ken experienced had started to work on his heart and passions, yet they were incomplete. Those serving as role models within this discipleship effort did not teach mathematics courses. They were researchers into methods of teaching. Classroom teachers contributing to Ken's university experience tended to strengthen his formulaic view of mathematics rather than providing a role model toward a broader view. The mathematics courses Ken had experienced, both at the university and before, also did not emphasize a more life-encompassing view of mathematics. Aspects of his disciplinary gifts were awakened, yet he lacked the rhythm and regularity in these formative practices in order to move him beyond the facts and procedures of his specialty.

In the Christian university we have an advantage when it comes to disciplinary discipleship. Since most of our students come to the university with a desire to grow in their faith, we can weave that path of spiritual growth with their path toward disciplinary growth. Both pathways require an element of humility, an acknowledgment that there is more for each of us to learn. Murray describes this essential disposition as follows: "This [disposition of humility] is the true self-denial to which our Savior calls us: the acknowledgment that self has nothing good in it except as an empty vessel which God must fill, and also that its claim to be or do anything may not for a moment be allowed." [8, p. 34] Humility was a rare disposition in Ken, who once referred to himself as a "math god" [5, p. 154]. Ball noted that one of the hindrances that developing mathematics teachers face in developing a broader understanding of mathematics is their success in a more formulaic approach to math. "Years of memorization, of focusing on answers, of inattention to meanings, have yielded reliably algorithmic ways of knowing and doing mathematics. Furthermore, the surrounding culture is even less oriented toward mathematical sense-making." [2, p. 15] Students usually pursue a specific discipline in their university studies due to success and gifting in that area. Pride in success and past achievements often serves as a hindrance to continued growth, but the Christian university's humble acknowledgment of a need for faith growth can contribute to a student's acknowledgment of a need for growth in their discipline.

4 Spiritual and Disciplinary Discipleship Intertwined

David Smith and Kevin Smith suggest that it is our practices or liturgies that form individuals. As such, if the pursuit of humility is not a regular practice within the Christian university, then this soil in which other virtues root [8, p. 17] will not be cultivated enough to produce the spiritual or disciplinary discipleship desired. Fortunately, many practices within Christian universities do promote humility. Taylor University's emphasis on servanthood through the Taylor Towel and its mission statement provides a foundation that encourages regular practical expressions of humility. Prayer in the classroom, while often discounted in efforts toward faith and learning integration,

provides an opportunity for students and faculty alike to acknowledge our inadequacies and our dependence on God. Even regular chapel programs can communicate to those attending that our lives are on a continual journey of coming to know God more fully and learning to die to self daily. These practices serve to provide spiritual discipleship, yet they also provide a fertile soil for disciplinary discipleship.

Like spiritual discipleship, disciplinary discipleship requires formative routines that will allow the life-encompassing qualities of the discipline to seep into the *kardia* and broaden the abilities of the student. In mathematics, one of our liturgies comes in the form of problem solving. Liberal arts students explore the impact of compounded interest on loans they may pursue. Calculus students create models of a roller coaster and inquire into the rates of change associated with the falls and turns. Statistics students determine how carefully collected data can inform decisions that they make. This competence in problem solving is further developed as students articulate justifications for the solutions they develop. While students still experience formulaic exercises related to procedures and concepts in their coursework, the rhythm of problem solving explorations helps them move from the “memorizing” view of mathematics that Ken and many other students experience toward the life-encompassing mathematical practices promoted by experts.

Again, the Christian university has an advantage as we are able to weave the processes related to faith and disciplinary discipleship. One student wrote the following when reflecting on her mathematics class at a Christian university:

Whenever you start with a problem, whether mathematical or personal, you have to ask yourself questions. For math, the questions are ones like, “What do I have to find? What information is given and what information do I already know without the information given in the problem?” You have to ask yourself the same kinds of questions when dealing with personal problem, whether dealing with earthly relationships or your heavenly one. When we want to find out more about God, we have to ask, “What exactly do we want to know? What do I already know relating to the subject and where can I find answers?” This course has taught me that there are many ways of finding these answers, whether the answers are from friends, family, or from God Himself. [7, p. 7]

The spiritual discipleship of the student actually enhances the disciplinary discipleship and vice versa, allowing the student to accept more life-impacting understandings of the content.

Another liturgy common for our mathematics students is the need to work in groups. From a disciplinary aspect, the group work helps mathematics students formulate their problems and explore alternative perspectives to represent the problem and create solutions. Students develop communication skills that allow them to justify their thinking with one another and test their logic. These group attributes “disciple” them into a broader disciplinary mindset. The work in groups is also a focus in faith discipleship. Group work provides an opportunity for students to serve one another as they share their different backgrounds and gifts. They are challenged to be God’s image bearers as they interact with one another, forgiving faults and building each other up. The disciplinary and spiritual discipleship work hand-in-hand as students seek and discover meaning both in their discipline and in their spiritual lives.

In the Taylor mathematics department, disciplinary discipleship is further encouraged through an emphasis on “big ideas”. “According to Ken Bain’s *What the Best College Teachers Do*, excellent teachers ask themselves what ‘big questions’ a course will help students answer, and how we can

motivate students to care about these questions [1]. The best teachers stir up excitement and curiosity within students to explore the important issues and applications of the discipline." [3, p. 10] Case and Colgan reformatted the “big questions” into “big ideas” that are emphasized and analyzed by students within their mathematics courses. The “big ideas” help students move beyond the isolated skills and procedures learned within the course to gaining an appreciation for the beauty and relevance of the topics. “The Big Idea reflection assignment asks how students have learned to think more like a mathematician as a result of exploring the Big Ideas in a course.” [3, p. 14] Much like the reflective assignments that helped Ken obtain a broader view of mathematics, reflecting on the “big ideas” requires students to commit in writing to a broader view of the mathematics that they have studied. They are being disciplined to develop mathematical ways of thinking. Some of the “big ideas” emphasize a connection between faith and mathematics, weaving the spiritual discipleship with the disciplinary discipleship. Knowing students will reflect on these “big ideas” at the end of the course, instructors explicitly emphasize them more often throughout the course, further helping students move from their former ways of knowing math into a more developed mathematical proficiency. The emphasis on “big ideas” is moving the mathematics from the students’ heads to their hearts.

5 Conclusion

Being a disciple of Jesus is not primarily a matter of getting the right ideas and doctrines and beliefs into your head in order to guarantee proper behavior; rather, it’s a matter of being the kind of person who *loves* rightly – who loves God and neighbor and is oriented to the world by the primacy of that love. [14, p. 32]

The term “discipleship” beautifully encompasses the mission of the Christian university. Much as it was for Jesus’s twelve, the rhythm and regularity in the interactions and experiences emerging adults sample in the university moves them beyond “right ideas and doctrines” and develops the heart. With the right liturgies, the student’s faith develops significantly toward the ideal faith taught by Jesus. Woven with disciplinary discipleship, the gifting and calling of students develops, preparing them to share their talents with others as they continue on the journey God provides.

References

- [1] Bain, Ken. *What the Best College Teachers Do*. Cambridge, Mass: Harvard University Press, 2004. Print.
- [2] Ball, Deborah Loewenberg. “Breaking with Experience in Learning to Teach Mathematics: The Role of a Preservice Methods Course.” *For the Learning of Mathematics*, vol. 10, no. 2, 1990, pp. 10–16.
- [3] Case, Jeremy, and Colgan, Mark. “‘Big Idea’ reflection assignments for Learning and valuing mathematics.” *Proceedings of the Association of Christians in the Mathematical Sciences Conference, May 31 – June 2, 2017*, edited by Russel Howell, Association of Christians in the Mathematical Sciences, 2018.
- [4] Council of Chief State School Officers (CCSSO) *Standards for Mathematical Practice*. <http://www.corestandards.org/Math/Practice>; 2019.

- [5] Eggleton, Patrick J. *The Evolving Mathematical Philosophy of a Preservice Mathematics Teacher*. 1995. Print.
- [6] Eggleton, Patrick J. Faith Learning Application Paper. October 20, 1999. TS. Written for Huntington College New Faculty Orientation – Author’s private collection.
- [7] Eggleton, Patrick J. Mathematics: An Infrastructure for Inquiry. January 2, 2004. TS. Written for Huntington University Tenure – Author’s private collection.
- [8] Murray, Andrew. *Humility*. New Kensington, PA: Whitaker House, 2004. Print.
- [9] *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA: The Council, 1989. Print.
- [10] *Principles to Actions: Ensuring Mathematical Success for All*. , 2014. Print.
- [11] Kilpatrick, Jeremy, Jane Swafford, and Bradford Findell. *Adding It Up: Helping Children Learn Mathematics*. Washington: National Academies Press, 2001. Internet resource.
- [12] Parks, Sharon D. Big Questions, *Worthy Dreams: Mentoring Emerging Adults in Their Search for Meaning, Purpose, and Faith*. San Francisco, CA: Jossey-Bass, 2011. Print.
- [13] Smith, David, and James K. A. Smith. *Teaching and Christian Practices: Reshaping Faith and Learning*. Grand Rapids, MI: W.B. Eerdmans Pub. Co, 2011. Print.
- [14] Smith, James K. A. *Desiring the Kingdom: Worship, Worldview, and Cultural Formation*, 2009. Print.
- [15] Taylor University. Strategic Directions 2026: Final Report. May 2015. TS. University archives.