

Mastering a Master's Degree – and Your Professional Career¹

By **M. E. Kabay, PhD, CISSP-ISSMP²**
Program Director, MSIA³

There are two fundamental approaches to graduate programs. The MSIA, the MBA, and the other online programs at Norwich fall into the fixed-curriculum model. Students work on a defined curriculum with specified courses, planned assignments, and uniform examinations. Many technically-oriented programs work this way.⁴

Research degrees often take a different form. Master's students in these programs take some courses, but those courses usually complement each student's particular academic background. All research degrees have a dissertation or thesis to be presented toward the end of the program. There is a defense of thesis in which examiners challenge the student in an oral exam to explain and justify the research procedures and conclusions reached in the student's work. Many research master's degrees are viewed as stepping stones to a doctorate.

Some students seem to coast through the MSIA program, simply doing the minimum work required to pass with a B.⁵ I've received complaints from a couple of students out of several hundred so far who have felt that the course is too easy or is at a baccalaureate level rather than at a master's level.

I think that we have failed to communicate to these students the critical differences between graduate programs and undergraduate programs.

Even though every university professor wants undergraduates to be autonomous learners who go beyond the curriculum, we recognize that undergraduates are (usually) young and inexperienced. Most undergraduates lack the background and perspective to develop their own course goals; they are lucky to be able to meet their professors' goals. Curriculum is set with limited expectations; much of the curriculum is devoted to introducing concepts and terminology and then applying this new knowledge to model projects. Occasionally, undergraduate students are privileged to become involved in experiential learning with a strong real-world component; for

¹ This essay first appeared in the MSIA Director's Corner < <http://grad.norwich.edu/msia/directorscorner/index.html> > on the Norwich University Online Graduate Programs Virtual Campus < <http://grad.norwich.edu> >.

² Associate Professor of Information Assurance, Division of Business and Management, Norwich University. <mailto:mkabay@norwich.edu>

³ Master of Science in Information Assurance

⁴ The MSIA program consists of six six-credit, 11-week courses over 18 months. Each course requires students to write a weekly 1,000-word essay based on research in their workplace; contribute to two online discussions a week, write eight 500-word memos in response to examination questions, and prepare a 5,000-10,000-word management report on relevant security issues for their managers. All weekly essay assignments include the option to suggest alternatives that may be more valuable to the student.

⁵ Grading in the MSIA assigns a zero score to any work with less than B-level quality. Any student with an overall score less than a B for a seminar is put on probation and must achieve an A in the next seminar to remain in the program.

example, they may be able to study a real factory, write a business plan for a community agency, design and implement a database and appropriate programs for a government office, or tutor real children in a real school.

In contrast, graduate programs expect students to be far more autonomous than they were as undergraduates. The aim of graduate programs is to enable students to develop the capabilities in research, analysis, synthesis and creativity to become contributors to their field, both in practical application and to the larger body of knowledge. Regardless of the kind of graduate program you are working in, you should look at the formal demands as a baseline; your task is to make the best of your time by your own lights, not just in accordance with somebody else's expectations. Let me give you a couple of examples of what I mean.



Figure 1. Scanning electron micrograph of a typical tardigrade.

When I was a graduate student at Dartmouth College 30 years ago and more, I took a graduate course in invertebrate zoology and wrote a paper on microscopic creatures called tardigrades.⁶ All we had to do in the course was read scientific papers and prepare a lecture for our fellow students about the animals we had chosen – and that's what the other students did for their A grades. In contrast, I chose to spend a couple of days in the lab washing and filtering a few cubic feet of moss to collect live tardigrades. When I gave my presentation, the class not only listened to a lecture – they also peered at live tardigrades through binocular dissecting microscopes. I got the same grade as I would have even without the lab work, but I felt that

I had learned and contributed a lot more than if I had just done the minimum required for an A. And I still remember tardigrades!⁷

⁶ * Tardigrade, any of a group of tiny arthropod-like animals characterized by four pairs of stubby legs ending in large claws, a stout body, rounded back, and lumbering gait. They are also known as "water bears." Tardigrades live worldwide in moist land habitats, along rocky shorelines, and on the bottoms of streams, lakes, and oceans. Their most striking feature is their ability to temporarily enter a nearly lifeless state known as anabiosis, which helps them survive environmental extremes. About 400 species of tardigrades are known and they range in length from 0.1 to 0.5 mm (0.004 to 0.02 in).

Tardigrades are most commonly found in association with the water film on mosses, liverworts, and lichens. Their densities may reach 2 million individuals per sq m (185,874 per sq ft) of moss. Some live in hot springs and a few live in a symbiotic relationship with or on the bodies of other animals. Tardigrades use a pair of oral stylets, or needle-like mouthparts, to pierce the walls of plant cells and feed on the liquid inside. Most species are plant eaters, but some are predators, feeding on tiny invertebrates and bacteria, and a few are detritivores, feeding on dead tissue and debris. . . .

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⁷ Indeed, I do my best to avoid tardy grades at all times [groooooaaanmn].



Figure 2. *Brachionus calyciflorus*, a fresh-water rotifer.

Another incident that comes to mind concerns my interest in statistics. I had become interested in applied statistics and experimental design in my work at McGill. When I came to Dartmouth in 1972, I worked on rotifer developmental biology⁸ but I made a point of helping fellow graduate students and eventually professors with their statistical needs. At one point, my research director criticized me for spending time on statistics. He felt that this activity was distracting from my experimental work and was a side issue. I argued strongly that applied statistics was an important component of my future career and that helping others was a useful way of deepening my own knowledge as well as serving the interests of the department. My

research director relented, allowed me to teach a graduate course in biometry (statistics applied to biology), and included a statistician in my comprehensive field examination committee. My doctorate ended up being in invertebrate zoology and applied statistics. As it happens, I have spent far more years teaching and applying statistics than teaching and applying invertebrate zoology.

Taking the initiative to expand knowledge and enhance practical application is not peculiar to academia. People who go beyond normal expectations at work are often rewarded – if not by promotion or bonuses, then by increased job satisfaction. For example, I had been at Hewlett-Packard for only a couple of months in 1980 when I was given training on a screen-formatting product called V/Plus 3000. This tool allowed the user to paint data entry screens on smart terminals and to include editing functions and error messages that could be processed locally (LANs had not yet been invented). I noticed that there was a sophisticated parser in the command language for this product; the MATCH command made it possible to scan a user's input word by word and give specific feedback. I went to my manager and announced, "This isn't just a screen painter: it's a programming language. We can create computer-aided instruction with this tool." As a result of that observation, I was sent to California for six months

⁸ Rotifer, any of a phylum of multicellular, generally microscopic, aquatic animals that are abundant worldwide, and are most frequently found in freshwater bogs, ponds, and puddles. Rotifers vary in shape but always have retractable, hairlike crowns of cilia that, in motion, resemble turning wheels. (Among the first microscopic life forms to be studied, they were commonly known as wheel animalcules.) The animals can attach themselves temporarily to surfaces by means of a cementing secretion from the "foot" of the body. They reproduce sexually, but males are rare; except under severe conditions, the eggs develop parthenogenetically. Rotifers feed on other microorganisms; a few species are parasitic.

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on a research project as well as for training and helped to create Hewlett-Packard's first computer-based training for the HP3000.⁹

The level of work in master's degree programs can vary widely. The MSIA should be taking somewhere around 15 to 20 hours a week, as opposed to the greater number of hours required by a thesis-based program, because we aim it at working professionals. Nonetheless, the graduate program goal of developing students' abilities as self-sustaining learners and contributors is unchanged. Students can make a success of their time in the MSIA program by using the curriculum and assignments as a springboard to acquire the knowledge that they want. Students should go beyond the simple and the obvious; contribute brilliant discussion entries with reference to technical details where appropriate. They can initiate new threads on topics that interest them in the student Agora. They can write essays that are at such a professional level that they can publish them as well as getting credit in the course. Students can prepare lectures on topics that interest them and use them in professional meetings as well as posting them to help their fellow students.

One of our MSIA students took advantage of the flexibility of our program to create a unified dissertation on the fundamentals of security architecture that we hope will become a published text and a genuine contribution to the entire field of information assurance. Now *that's* initiative.

I hope to see our students graduating with pride as the *best* students possible – students who have grown in knowledge and contributed to the growth of others in the program.

Students, don't let the locus of control lie entirely outside yourself. Use your opportunities wisely and let your graduate program be the *start* of what you study, not the end.

Now go and study.¹⁰



⁹ For the geekier readers, it was a SYSDUMP simulation, teaching users how to use a tool for configuring the HP3000.

¹⁰ Some people have noticed that I finish many of my lectures and homilies with this phrase. Many Jews will recognize it, but most gentiles may not. It comes from the great Jewish scholar, Hillel the Elder (~70BCE – 10 CE), who was born in Babylon but lived and became head of a rabbinical council in Jerusalem 2,000 years ago. He was once asked by a Roman soldier to summarize Judaism "while standing on one foot" (i.e., to give what we might call an elevator-speech about Jewish theology). Hillel's response was, "What is hateful to you, do not do to your neighbor. That is the heart of the law; all the rest is commentary. Now go and study!"