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This month we focus on education. Education is one of the primary goals of the MTA and of the MTA Educational Foundation and should be of interest to all MTA members. Academic interest in technical analysis is currently developing in business schools around the country, indeed around the world. Gone are the days when professors would not mention the words "technical analysis," though some still have difficulty with the terms and use "noise trading" instead. Can you believe it? Nevertheless, the likes of Professors Lo, LeBaron, Titman, Jegadeesh, Brock, Lakonishok, and others from very distinguished schools have not only demonstrated considerable doubt about the tired random walk theories of the past but have also begun the process of demonstrating the statistical validity of technical analysis. The collapse of the speculative bubble in stocks and the disrepute of fundamental analysts and their inability to understand when to sell have, of course, helped too. Every week we receive inquiries from professors at U.S. schools wishing for more information on how to teach a course in technical analysis. At last, we appear to be on the verge of academic recognition.

This issue of the Journal includes articles from business school professors actually taking the step to introduce either technical analysis courses or introduce technical analysis in their investments courses. They are pioneers in the educational effort to introduce education in technical analysis and are to be greatly commended by our association.

But let us not forget our valiant members like Roth, Kamich, Brown, Powell, Teixeira, Erlanger, Acampora, Dickson, Pruden, Luca and others who have been teaching courses in technical analysis for many years. Indeed, some of the most innovative suggestions on how to teach technical analysis have come from these people. Fritz Brown, for example, who teaches a full course in technical analysis at Mercer University in Atlanta, has introduced a trading game using only the Dow Jones stocks. He divides the class into groups of three or four individuals each and establishes trading and reporting rules. The objective of the exercise is to present the reasons for action or non-action to the class, forcing the participants to think and learn in a simulated real-time situation. The students love it.

In this issue Professors John Earl and William Charleton of the University of Richmond write about a survey of their students and ways they could improve upon their course. Professors Kristine Beck and Elizabeth Goldreyer of the University of Wisconsin Oshkosh and the University of Denver respectively present an excellent exercise in moving averages of under-developed trading markets. And finally, our own Professor Hank Pruden of Golden Gate University introduces a concept of teaching he calls the "Action Sequence" method, which he uses in his many courses on technical analysis.

I hope this beginning of the next major stage in the history of the MTA inspires you to consider contacting your alma mater or local college or university and introducing them to technical analysis. The MTAEF is always willing to help in any manner possible. It has developed its own self-contained course, which every day is being improved upon, and I am available to introduce it or talk about teaching technical analysis to any academic interested. I have also begun teaching, assisting MTA member Dean of the Business School, Skip Cave, of Fort Lewis College here in Durango, CO. We are working on improving the MTAEF course and testing changes with the students' input. It's not only satisfying to witness the comprehension and excitement of young minds at work, but it also keeps me on my toes.

Charles D. Kirkpatrick II, CMT, Editor

Journal Editor & Reviewers

Production Coordinator

Barbara I. Gomperts
Financial & Investment Graphic Design
Marblehead, Massachusetts

Publisher

Market Technicians Association, Inc.
74 Main Street, 3rd Floor
Woodbridge, NJ 07095

The Organization of the Market Technicians Association, Inc.

Member and Affiliate Information

MTA Member

Member category is available to those "whose professional efforts are spent practicing financial technical analysis that is either made available to the investing public or becomes a primary input into an active portfolio management process or for whom technical analysis is a primary basis of their investment decision-making process." Applicants for Member must be engaged in the above capacity for five years and must be sponsored by three MTA Members familiar with the applicant's work.

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MTA Affiliate status is available to individuals who are interested in technical analysis and the benefits of the MTA listed below. Most importantly, Affiliates are included in the vast network of MTA Members and Affiliates across the nation and the world providing you with common ground among fellow technicians.

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- receive the monthly newsletter, *Technically Speaking*
- receive the *Journal of Technical Analysis,* bi-annually
- have access to the MTA website and e-mail network
- have access to the MTA lending library
- become a Colleague of the International Federation of Technical Analysts (IFTA)

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Charles D. Kirkpatrick II, CMT
7669 CR 502
Bayfield, CO 81122
journal@mta.org

The State of Technical Analysis in Practice and in College Curriculums: *A Survey of Technical Analysts*

William T. Charlton, Jr., Ph.D., CFA and John H. Earl, Jr., Ph.D., CFA

Introduction

A recent article in the Journal of Technical Analysis (formerly the MTA Journal (Issue 52, Summer-Autumn 1999) described a technical analysis class available at the University of Richmond. The article offered recommendations to increase the attractiveness of a technical analysis course to universities. This article presents the results of a survey of the membership of the Market Technicians Association (MTA) soliciting their opinions on this issue. The survey asked questions pertaining to the desirability of teaching a technical analysis class at the university level, what the technical analysis curriculum should be, who should teach the course, and how the course should be promoted.

The Survey

With the assistance from the MTA, the survey was sent to 350 randomly selected regular and affiliate members of the MTA. Phil Roth and Dick Dickson, representing the MTA Education Committee, included a cover letter. Responses were sent to the MTA in New York by mail and fax. One hundred and twenty-eight responses were received. The typical response rate for mail surveys is on the order of four percent. The thirty-six percent response rate indicates that the MTA membership holds an above-average interest in the future of the organization. The results of the survey are presented in the following sections: respondent background information, coverage of technical analysis in university curriculums, questions about support for university level courses for technical analysis, proposed changes in the Chartered Market Technician (CMT)[1] designation, changes to the MTA, and a summary/conclusion.

Survey Results

Respondent Background Information

Panel A of Table 1 shows that ninety-six percent of the respondents are regular members of the MTA. Slightly more than two-thirds either hold the CMT designation (57.5%), or are candidates (11.0%) for the designation. Close to sixty percent of respondents (59.5%) have been members of the MTA for seven years or longer.[2] Interestingly, almost two-thirds (65.5%) of the survey respondents stated that their firm does not reward professional designations such as the CMT and CFA (Chartered Financial Analyst).[3] Clearly our respondents do not believe that their employers place a high value on professional designations. Subsequent questions also raise the issue of the willingness of companies to financially support CMT activities.

Table 1

Background Information of Survey Respondents

Responses are reported as percentage of the respective sample.

Panel A. MTA Membership Status.

	Regular	Affiliate	Honorary	N
All Respondents	96.0	4.0	0.0	126

Panel B. Years of MTA membership.

	1-3 yrs.	3-7 yrs	7-15 yrs.	>15 yrs.	N
All Respondents	10.3	30.2	38.1	21.4	126

Panel C. CMT charter holder.

	Yes	No	Candidate	N
All Respondents	57.5	31.5	11.0	127

Panel D. Country of Residence.

	U.S.	Other	N
All Respondents	91.4	8.6	128

Panel E. Does your firm reward professional designations?

	Yes	No	Do Not Know	N
All Respondents	25.2	63.5	11.3	115

Table 2 presents the geographic distribution of those respondents that specified their location. Not surprisingly, a large percentage of respondents live in the New York and New Jersey area (37.9%). After the top three states, the remaining states have relatively few MTA members. This may present problems for universities that would like to initiate a technical analysis course but are not located in the top states.

Table 2

Geographic Distribution of Respondents

Responses are reported as the number of responses.

	Responses		
State	Number	% (N=108)	Cumulative %
NY	25	23.1	23.1
NJ	16	14.8	37.9
CA	14	13.0	50.9
FL	6	5.6	56.5
MA, VA	5	4.6	65.7
GA, IL	4	3.7	73.1
CO, CT, PA, TX	3	2.8	84.3
KS, MI, MN, NM	2	1.9	91.9
AZ, KY, ME, MT, NC, OH, OK, SC, UT	1	0.9	100.0

The questions presented in Tables 3 and 4 asked the respondents to rank their job functions and disciplines respectively. The tables give both the rankings and the number of respondents who checked a given choice. Finally, the total number of respondents who ranked it in any category or checked it is given. As Table 3 shows, the majority of respondents are practicing technical analysts and/or portfolio managers. Of the top three disciplines used, Table 4 indicates that most respondents use Trend/Momentum and Bar Chart Patterns. Other techniques such as Relative Strength, Volume, and Sentiment are also popular.

Table 3

Ranking of Top Three Job Functions

Responses are reported as the number of responses. A ranking of 1 is the highest.

	Ranking				
Discipline	1	2	3	Checked	Total
Technical Analyst	28	15	10	47	100
Portfolio Manager	21	9	4	18	52
Research Director	4	5	5	14	28
Trader	7	8	8	20	43
Broker/Sales	4	1	2	6	13
Newsletter Editor	0	3	7	13	23
Publisher/Writer	2	11	7	25	45

Table 4

Ranking of Top Three Disciplines Used

Responses are reported as the number of responses. A ranking of 1 is the highest.

	Ranking				
Discipline	**1**	**2**	**3**	**Checked**	**Total**
Trend/Momentum	20	15	17	40	92
Supply/Demand	6	2	10	14	32
Relative Strength	5	16	4	23	48
Sentiment	2	7	5	20	34
Intermarket	2	3	3	4	12
Candlesticks	4	1	4	11	20
Elliott Wave	2	3	2	11	18
Cycles	4	3	3	7	17
Volume	1	10	5	22	38
Bar Charts	14	4	8	30	56
Point and Figure	4	1	4	14	23
Market Profile	1	1	1	6	9
Gann	0	1	1	3	5

Coverage of Technical Analysis in University Curriculums

The next set of questions (Table 5) focus on the respondents' opinions of the current state of technical analysis in universities. Nearly eighty percent (78.9%) of respondents believe that university curriculums currently do not adequately cover the topic of technical analysis (Panel A). Particularly interesting is that less than three percent (2.3%) feel technical analysis is given adequate coverage in business schools. Almost ninety-eight percent (97.7%) either strongly support (71.9%) or support (25.8%) the concept of including technical analysis within college investment classes (Panel B).

Table 5

Questions about the Coverage of Technical Analysis in College Courses

Responses are reported as a percentage of the respective sample or sub-sample.

Panel A. Do you feel the subject of technical analysis is currently being covered adequately in university finance curriculums?

	Yes	No	Do Not Know	N
All Respondents	2.3	78.9	18.8	128

Panel B. Do you support the concept of technical analysis courses being taught at accredited universities?

	Strongly Support	Support	Neutral	Oppose	Strongly Oppose	N
All Respondents	71.9	25.8	2.3	0.0	0.0	128

Panel C. Who do you think is best qualified to teach a university course in technical analysis?

	Academic Ph.D.	Practitioner/ Technician	Academic with MTA Training	Team Approach	N
All Respondents	0.8	37.1	8.9	53.2	124

Practicing technicians, however, place very little faith in the ability of academics to teach technical analysis. Less than one percent (0.8%) believes an academic Ph.D. is best qualified to teach technical analysis (Panel C). Even if the academic has MTA training, less than nine percent (8.9%) think this is the best option for providing a course on technical analysis. Thirty-seven percent (37.1%) favor the course being taught by a practicing technician.[4] As described in Charlton and Earl (1999), this is the approach used at the University of Richmond. Interestingly, the respondents felt that the best teaching format was a team approach, combining an academic to teach the theory and a professional technician to apply to theory in terms of practical application. Given the geographic clustering of MTA members around financial centers the team teaching approach could be difficult to implement for many schools. Alternative teaching methodologies such as the use of video conferencing and taped lecture series would allow this format to be available to a wider range of universities.

Support for a Technical Analysis Course

Table 5 established that there is a perceived lack of attention to technical analysis within business school curriculums. The next set of questions (Table 6) shows the willingness of the membership of the MTA to actively work with academics to improve the coverage of technical analysis in college curriculums. Panel A of Table 6 shows that almost seventy percent (69.6%) of the respondents would be willing to be a guest speaker in a technical analysis class at a local university. An additional twenty-seven participants (21.6%) responded that they might be willing to act as a guest speaker, for a total potential willingness ("definites" and "maybes") of 91.2%. As would be expected, the pool of guest speakers able or willing to travel out of state to universities drops to 74.4% "definites" and "maybes" (Panel B). A group this size should allow the MTA to provide speakers to a substantially increased number of universities

Employer support is an important factor in the ability of MTA members to assist with technical analysis courses. Forty-one percent (41.0%) of the respondents believe that their employer would provide them with time off to travel to teach in technical analysis programs (Panel C). An additional 24.6% of the survey participants think their employers might provide time off. Only 18.0% of the responses indicated that their employer would help cover the cost of traveling.

Table 6

Questions about Support for a Technical Analysis Course

Responses are reported as a percentage of the respective sample or sub-sample.

Panel A. Would you be willing to be guest speaker for a technical analysis course if one were offered at a university near your location?

	Yes	Maybe	No	N
All Respondents	69.6	21.6	8.8	125

Panel B. Would you be willing to travel out of state to guest lecture on your area(s) of specialization in a technical analysis course?

	Yes	Maybe	No	N
All Respondents	38.4	36.0	25.6	125

Panel C. Would you or your employer support your participation by providing you with the time to travel?

	Yes	Maybe	No	Do Not Know	N
All Respondents	41.0	24.6	18.0	16.4	122

Panel D. Would you or your employer support your participation by helping to cover the cost of traveling?

	Yes	Maybe	No	Do Not Know	N
All Respondents	16.8	24.4	29.5	19.3	119

Panel E. Would you be willing to teach a course in technical analysis at a university located near you?

	Yes	Maybe	No	N
All Respondents	40.7	29.7	29.7	118

Panel F. Would your firm be willing to offer paid internships to students studying technical analysis?

	Yes	Maybe	No	Do Not Know	N
All Respondents	5.9	23.7	47.5	22.9	118

These results suggest that there exists a strong core of practicing technical analysts willing to make the commitment to expand technical analysis course offerings. However, the MTA and/or the sponsoring university may be required to cover some or all of the traveling costs incurred by the speakers. The University of Richmond has been fortunate to have a number of practicing technicians who have donated their time and covered their own expenses (or their firm did) to be guest speakers in our technical analysis class. As the number of courses offered nationwide increases, the demands on speakers' time and on financing their trips will increase.

Forty-eight respondents (40.7%), as shown in Panel E, would be willing to teach a course on technical analysis at a local university. This significant number of respondents could provide a good foundation for expansion of technical

analysis courses in universities. As mentioned above, the heavy concentration in relatively few states will effectively decrease the number of schools that will have access to this benefit. Also, once the workload and time demands necessary for teaching a semester-long course are understood, the number of willing respondents may decrease. Each course requires an academic and/or practicing technician to be responsible for the overall course presentation, developing a syllabus, coordinating the guest speakers, preparing examinations and determining grades. This represents a significant commitment of time and energy. Dick Dickson (Senior VP-Senior Market Strategist, Lowry's Reports, Inc.) has handled this responsibility at the University of Richmond for the last four years.

The number of respondents willing to serve as guest speakers, and especially the number willing to sponsor the classes provides a strong impetus for the MTA to aggressively build alliances with the academic community. What the best structure is to mitigate some of the limitations discussed above remains an open question.

Panel F of Table 6 provides additional evidence that employers' support for CMT Programs is limited. Only 5.9% respondents indicated that their firms could offer paid internships to students studying technical analysis with an additional 23.7% indicating that it might be possible. Increasingly, New York internships between a student's junior and senior year are becoming a prerequisite to a Wall Street job offer. More firms are placing increased emphasis on internships to select future employees rather than college recruiting visits; they find it reduces the uncertainty on both sides. If students pursuing other professional designations such as the CFA are offered internships, a CMT/technical analysis track will have to provide the similar opportunities to attract the best and brightest students to the profession.

Course Materials

The questions in Table 7 examine our respondents' opinions on the appropriate materials to use in an introductory course in technical analysis, specifically the choice of a textbook. Panel A compares two popular technical analysis textbooks: Technical Analysis Explained by Martin Pring, and Technical Analysis of the Financial Markets by John Murphy. While the majority of respondents support or strongly support either textbook, the Murphy textbook is clearly preferred by the members in our sample. Support exists for an MTA sponsored university textbook covering the essentials of technical analysis, but it is not overwhelming (Panel B). Fifty-six percent (55.6%) of the respondents either strongly supports or supports an MTA sponsored textbook. A third of the respondents are neutral and eleven percent (11.2%) opposes or strongly opposes the concept. Panel C shows that support for an MTA sponsored textbook to cover the body of knowledge of the CMT Level 1 examination is relatively strong (62.5% supports or strongly supports). Forty-seven respondents (38.2%) would definitely be willing to contribute material to an MTA sponsored textbook, and another forty-nine (39.8%) would be willing as possible contributors. The responses suggest that the MTA membership is satisfied with available technical analysis textbooks but would support the development of an MTA sponsored university textbook and readings book for the CMT level one examinations.

Table 7
Questions about Course Materials
Responses are reported as a percentage of the respective sample or sub-sample.

Panel A. Please rank the appropriateness of the following books.

	Strongly Support	Support	Neutral	Oppose	N
Technical Analysis Explained by Martin Pring	32.0	44.3	22.1	1.6	122
Technical Analysis of the Financial Markets by John Murphy	66.9	28.2	4.8	0.0	124

Panel B. Do you feel that the MTA should publish its own textbook covering the essentials of technical analysis that would be used for university classes covering technical analysis?

	Strongly Support	Support	Neutral	Oppose	Strongly Oppose	N
All Respondents	28.2	27.4	33.1	5.6	5.6	124

Panel C. Should the MTA textbook also be used as a vehicle to incorporate the required body of knowledge covered in the CMT Level 1 examination?

	Strongly Support	Support	Neutral	Oppose	Strongly Oppose	N
All Respondents	31.7	30.8	30.8	1.7	5.0	120

Panel D. Would you be willing to contribute material to such a textbook?

	Yes	Maybe	No	N
All Respondents	38.2	39.8	22.0	123

Importance of Technical Analysis Disciplines

Table 8 shows respondents' relative rankings of the importance of topic areas that should be covered in an introductory course. Fourteen disciplines identified from the MTA Membership Directory are proposed as potential subjects or chapter headings for a technical analysis textbook (these are the same topics that were used in Table 4). Of the fourteen topics, only two (Elliott Wave and Gann) received a very important ranking by less than 20% of the survey respondents. Elliott Wave, Gann and Market Profile could be combined into one chapter, resulting in a twelve-chapter format as the core of an MTA textbook. If the MTA chose to pursue a collaborative textbook, each of these topic areas could be divided into segments and assigned to the survey respondents who indicated a willingness to contribute material. Such an approach would require the MTA staff or an outside editor, chosen by the MTA, to coordinate the activities of the contributing authors.

Table 8
The Relative Importance of Disciplines for a Technical Analysis Course
Responses are reported as a percentage of the respective sample or sub-sample.

	Importance				
Discipline	Very Important	Somewhat Important	Neutral	Not Important	N
Trend/Momentum	90.2	9.0	0.8	0.0	122
Supply/Demand	66.9	17.8	11.9	3.4	118
Relative Strength	65.0	25.2	8.9	0.8	123
Sentiment	59.0	27.0	13.1	0.8	122
Intermarket	39.0	40.7	17.8	2.5	118
Cycles	25.4	40.2	27.9	6.6	122
Volume	60.3	31.4	7.4	0.8	121
Bar Charts	77.0	12.3	9.0	1.6	122
Point and Figure	34.2	35.8	26.7	3.3	120
Market Profile	21.2	21.2	43.4	14.2	113
Candlesticks	23.5	42.0	26.9	7.6	119
Elliott Wave	15.8	34.2	29.2	20.8	120
Gann	7.7	25.6	35.9	30.8	117
History of Technical Analysis	40.2	36.9	16.4	6.6	122

Changes to the CMT Exam

The next set of questions (Table 9) examines the support for several proposed changes to the CMT Program and exam. Panel A shows that the support for scholarships for college students is mixed with only 28.0%, definitely supporting such a program, and an additional 32.0% possible supporters. The results for faculty scholarships are slightly stronger (Panel B). Forty-one percent (41.1%) of the respondents definitively support faculty scholarships while an additional 33.1% would consider them. Academics are trained as fundamentalists and generally look at technical analysis skeptically. Exposing finance faculty to the discipline is an important step to gaining acceptance in academia.

Table 9

Questions About Changes to the CMT Program.

Responses are reported as percentage of the respective sample.

Panel A. Do you support the idea of scholarships and/or reduced examination costs to encourage college students to take the CMT Level 1 exam?

	Yes	Maybe	No	N
All Respondents	28.0	32.0	40.0	125

Panel B. Do you support the idea of scholarships and/or reduced examination costs to encourage college faculty to take the CMT Level 1 exam?

	Yes	Maybe	No	N
All Respondents	41.1	33.1	25.8	124

Panel C. Do you support exempting students from taking the CMT Level 1 exam if they take an MTA approved university level course and earn a grade of a "B" or higher?

	Yes	Maybe	No	N
All Respondents	35.5	23.4	41.1	124

Panel D. Do you support a Level 3 CMT examination to replace the current research paper requirement?

	Yes	Maybe	No	N
All Respondents	48.0	22.8	29.3	123

Slightly over a third of the respondents (Panel C) supported exempting students from taking the CMT Level 1 exam if they had taken a course in technical analysis course and received a "B" or higher. However, 41.1% did not support an exam waiver. Finally, a question addressed the possibility of replacing the Level 3 research paper requirement with an examination (Panel D). Nearly half of the respondents supported this proposal, and an additional 22.8% answered "maybe." Delineating research topics and finding CMT's to evaluate the quality of the resulting research projects is a major impediment to making the CMT a broad based investment designation. It appears that the members in this sample are cognizant of this limitation.

In all four questions presented in Table 9, the "maybe" option was selected between one-fourth and one-third of the time. The acceptance of any of the proposals is dependent on the decision the "maybes" would ultimately make. Interpretation of this relatively large "swing" vote suggests that the respondents to the question would consider such an option but that they are reserving their opinion pending more information on the specific details of the given proposal. The members in our sample appear to be open to proposed changes in the CMT Program, but any proposals presented to them should be sufficiently justified and specific in nature.

This level of resistance to encouraging/allowing students to pursue the designation requires further examination by the MTA education board. Are the members concerned that students who understand the academic theory but lack practical experience in the real world would be viewed by the public as "experts" because they hold the CMT designation? The CFA designation and the Association for Investment Management & Research (AIMR) actively promote their designation to college students by offering an ambitious scholarship program. To earn the CFA designation candidates not only must pass three examinations but also must meet requirements for a given number of years experience in relevant investment related professions. In terms of waiving the Level 1 examination the MTA would have the authority to approve the textbook, instructor and content of the university course before sanctioning the program as approved. The testing format could also be made subject to approval by the MTA. The vast majority of responding members state that universities do not adequately cover technical analysis in their investments curriculum. Students today are focused on skills and courses that add value to their resumes and career potential. Employers, academics and CFA/AIMR actively promote the fundamental analysis side of the profession through internships, course offerings, research, career opportunities and an attractive user-friendly certification program (CFA). The MTA membership needs to address the gulf between general support for expanding awareness of technical analysis and their reluctance to making the CMT designation available to a broader audience.

Questions about the MTA

The CMT designation does not enjoy the popularity of the CFA. 190 individuals hold the CMT designation while the CFA has over 35,500 charter holders.[5] Many investment professionals view the CMT as a specialty or niche designation held primarily by practicing technicians. A crucial issue to be addressed by the MTA and the board of the CMT is whether or not to attempt to broaden the appeal of the designation. The last set of questions examines issues associated with changes to the MTA itself (Table 10).

Table 10

Questions About Changes to the MTA.

Responses are reported as percentage of the respective sample.

Panel A. Do you think that the appeal of the designation can be broadened without adversely impacting the standards of the program?

	Yes	Maybe	No	Do Not Know	N
All Respondents	40.5	25.6	9.9	24.0	121

Panel B. Do you support broadening the base of candidates in the CMT Program to include the following:

	Yes	Maybe	No	N
Fundamental Analysts	55.4	17.4	27.3	121
Academic/University Ph.D.'s	58.0	31.1	10.9	119
University Students	44.2	30.8	25.0	120

Panel C. Do you support the concept of an MTA Education Institute to promote technical analysis and the CMT Program?

	Yes	Maybe	No	N
All Respondents	68.5	25.8	5.6	124

Panel D. Do you feel the MTA should offer competitive research grants to promote academic/applied research on technical analysis?

	Yes	Maybe	No	N
All Respondents	46.0	35.7	18.3	126

Panel E. Would you be willing to have MTA increase their annual membership dues to cover the expenses associated with increasing awareness of technical analysis and exposure for the CMT designation?

	Yes	No	N
All Respondents	50.0	50.0	121

Panel A indicates that almost forty-one percent (40.5%) of the respondents believe that the appeal of the designation can be broadened without adversely impacting the program's standards. Twenty-six percent (25.6%) replied maybe, twenty-four percent (24.0%) did not know, and only ten percent (9.9%) replied no. Panel B addresses the desirability of positioning the designation to appeal to academics, fundamental analysts and university students. The majority of the respondents favor encouraging academics (58.0%) and fundamental analysts (55.4%) to pursue the CMT designation. There is less support (44.2%) for allowing or encouraging university students to sit for the examinations. There exists a significant amount of ambivalence and outright opposition (no 27.3%, 10.9% and 25%) to expanding the designation.

Sixty-nine percent (68.5%) support the concept of an MTA Education Institute to promote technical analysis and the CMT Program while only 5.6% oppose an Education Institute (Panel C). From Panel D, many of the members in the survey believe that the MTA should definitely (46.0%) offer research grants to encourage research in technical analysis and an additional 35.7% would consider such a program. The final question asked the members in the survey if they would accept an increase in their dues to fund awareness programs. From Panel E, it is clear that the membership is evenly split on the funding of the MTA for broadening activities.

Conclusion

We have presented the results of a survey of MTA members. A significant majority of the members do not believe that the topic of technical analysis is adequately covered in university finance curriculums. A similar majority thinks that technical analysis should be taught at the university level, but most respondents do not believe that finance professors are the best alternative for teaching the course. One of the more important results presented is that many of those responding to the survey are personally willing to help in various ways to expand the current coverage of technical analysis. While many of the respondents responded positively to proposed changes to both the CMT and MTA, it appears that many withheld support until they know more about the purposes of the changes and the exact nature of the changes. Our interpretation of the results is that members recognize that the current situation is less than optimal, are willing to personally invest in improving the circumstances, and will consider changes to the CMT and MTA.

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Footnotes

1 *CMT is a registered service mark of the Chartered Market Technician and the Market Technicians Association, Inc.*

2 *All of the results presented in later tables were partitioned by both the years of membership and designation status without any substantial difference in the conclusions.*

3 *CFA is a registered trademark of the Institute of Chartered Financial Analysts, licensed to the Association for Investment Management and Research.*

4 *Many universities, due to accreditation issues, require adjunct faculty to have advanced degrees, which may further limit the pool of available instructors.*

5 *MTA statistics and the 2001 CFA Study Guide, Level 1*

***Note**: Since this paper was submitted and approved for publication, several of the recommendations for CMT designation have been implemented. ed.*

Biographies

William T. Charlton, Jr., CFA, is an assistant professor of finance at the E.C. Robins School of Business at the University of Richmond. He teaches corporate finance and investments as well as acting as the faculty advisor for the CFA Track and the University of Richmond Student Managed Investment Fund (known as the Spider Fund). He holds a bachelors of science in electrical engineering from Texas A&M University, an MBA from St. Mary's University (San Antonio, Texas), and a Ph.D. in finance from the University of Texas at Austin. Prior to entering the Ph.D. program, he worked for Hewlett Packard for five years as a computer field engineer.

John H. Earl, Jr. is an associate professor of finance at the E.C. Robins School of Business at the University of Richmond. He teaches corporate finance, investments and portfolio management/security analysis at both the undergraduate and graduate levels. John holds bachelors and masters degrees in finance from the University of Massachusetts and a Ph.D. in finance from Arizona State University. In addition, he holds the CFA, CLU, ChFC, CIC, CFP, and ARM designations.

System States of Pedagogy and the Action Sequence Method

Henry (Hank) Pruden, Ph.D.

Abstract

This article reports the theory, processes and findings of a longitudinal case study during which an active-learning methodology was introduced into a curriculum for working adult students. Change in teaching and learning involved a holistic system state shift from a teacher-centered/lecture-centered class to a student-centered/active-learning centered class. Theory building in the scholarship of pedagogy and the learning elements of the Action Sequence method are discussed.

Case Study

A goal of this study was to test the hypothesis that active-learning pedagogy gives rises to a higher degree of higher order learning (skills, judgment and evaluation) than does a lecture-centered methodology. The study focused upon the changes made in pedagogy during the last two years of a sixteen-year longitudinal program of curriculum and course modifications. The author operated as participant observer and change agent in a natural laboratory setting conducive to grounded research in which his career-oriented working adult students were also his professional colleagues in the field of securities trading and technical market analysis. Although the scholarship of teaching was the focal point and improving student learning was the goal, it was concluded that the scholarships of discovery, integration application and teaching were inextricably linked together in a system. Hence a change from a lecture-centered approach to an active-learning methodology necessitated shifts in all of the four types of scholarship from one system state to a radically different system state. The shift to a system state dominated by active learning hinged upon development of the Action Sequence method of active-learning.

System States and Theory Building

Boyer's reclassification of scholarship into the four elements of discovery, integration, application, and teaching contributed to a revitalized interest in raising the status and the performance of collegiate teaching (Boyer 1990; Richlin & Cox, 1991). Focusing upon the scholarship of teaching would presumably lead to improved classroom performance resulting in better informed and more skillful students, happier parents and more sympathetic legislatures. Accomplishing this goal of upgrading the scholarships of teaching on the collegiate campus could result in part from a reordering of priorities by the professorate. Teaching would gain relative to research if time, interest and rewards shifted in favor of teaching. Gaining recognition and respect for teaching could also partially result from the creation and adoption of superior teaching theories and methods. To advance the recognition and perform the scholarship-of-teaching/ scholarship-of-pedagogy must, in its own right, be viewed as a serious intellectual undertaking and thus an object worthy of the respect granted to research in the disciplines (Richlin & Cox, 1991).

Efforts to highlight the scholarship of pedagogy as an element that is distinct from the scholarship of discovery and worthy of serious intellectual scholarship in its own right have tended to draw attention to areas which separate teaching from research. Emphasizing these distinctions simply underscores the difficulty of breaking away from the old "teaching versus research" argument. Yet, happily, the very notion of the scholarships of teaching, discovery, integration and application carries within it a powerful centrifugal force. Pulling the elements of scholarship together into a whole flows naturally from the dynamic interaction and mutual interdependence of teaching, discovery, application, and integration. This pull toward unity should draw the teacher-researcher, who is intent upon the scholarship of pedagogy, toward systems and system states for theory building and research design (Dubin, 1978).

Adopting a system states approach to theory building would constitute a step toward viewing the scholarship of pedagogy as a serious intellectual undertaking and an object worthy of the respect granted to research in the disciplines. Logic and experience have persuaded this author that incorporating the scholarship of pedagogy as an element in a system model, along with the scholarships of discovery, integration and application, is the preferable way to build theory and to guide research. The systems approach brings clarity to the interdependencies and mutually reinforcing relationships amongst the four dimensions of scholarship.

The logic of a systems model for framing the scholarship of pedagogy was evident in Boyer's conclusions:

> *Here, then, is our conclusion. What we urgently need today is a more inclusive view of what it means to be a scholar-a recognition that knowledge is acquired through research, through synthesis, through practice, and through teaching. We acknowledge that these four categories-the scholarship of discovery, of integration, of application, and of teaching-divide intellectual functions that are tied inseparably to each other. Still, there is value, we believe, in analyzing the various kinds of academic work, while also acknowledging that they dynamically interact, forming an interdependent whole. Such a vision of scholarship, one that recognizes the great diversity of talent within the professorate, also may prove especially useful to faculty as they reflect on the meaning and direction of their professional lives. (Boyer, 1990, p24)*

Clearly a system model is appropriate to deal with elements "that ... dynamically interact, forming an interdependent whole."

Because of teleology, a systems approach provides a consistent rationale for emphasizing one or more elements of the scholarship mix. A general system is teleological in that the goal sought organizes the elements of the system (Dubin, 1978; pp. 239-236). A college professor who wishes to extend the scholarship of pedagogy is not normally a disinterested observer. On the contrary, the collegiate teacher-researcher seeking to improve the learning of his or her students is a very interested participant-observer in almost all undertakings designed to improve the scholarship of pedagogy. Indeed, it is this very interest of the professor in enhancing teaching and learning (the goal sought) that attracts relative attention to and expands the comparative importance of the scholarship of pedagogy.

In a similar vein, the same professor, intent upon the scholarship of discovery within the classroom, could slip into the mental framework of disinterested observer. In this latter instance, the professor's research goal would cause a comparative expansion in the importance of the scholarship of discovery. Hence, within the complex of the four scholarships it is the intention of the teacher-researcher (the goal sought) that places one element of scholarship into the foreground while shifting other elements to the background. Despite the movement of elements such as scholarship of discovery or the scholarship of teaching to the foreground or the background, depending upon the goals of the teacher-researcher, all elements of scholarship remain inextricably linked within a systems framework.

Research methodologies include fieldwork, surveys, and experimentation. Indeed, Brewer and Hunter (1989) counsel the researcher to employ these research methods in combination in order to shed the most light on a (pedagogical) problem under scrutiny. In this study, the case-study method of research emerged as the most natural approach for studying the complex interactions among teaching materials, discipline specific subject matter, learning goals,

classroom setting, student learning styles and active versus passive levels of student involvement.

The case-study method of research has a close affinity to and can be enriched by concepts and procedures from grounded theory (Mann, 1993). Characteristic of grounded theory which were pertinent to the case-study research method employed in this article include constant comparison, prolonged engagement, active participation of research subjects, practice based research, and a strong linkage to theory.

The Case

Background

Dr. Hank's course in stock market chart reading, and prediction, later entitled The Technical Analysis of Securities, was consistently popular. Semester after semester, beginning in 1976, his evening graduate class in the business school was dominated by non-degree professionals drawn from local brokerage houses, the Pacific Stock Exchange and from the ranks of individual and institutional money managers around the San Francisco Bay Area. Many of these professionals already possessed advanced degrees in finance or related business subjects.

Attracting such high-quality students was reassuring to Dr. Hank, who had left a full-time tenured post at the University of Texas to pioneer the teaching of technical market analysis courses while concurrently engaging in his own business of market analysis and trading. This consistent turnout of highly qualified students was likewise reassuring to Dr. Hank's employer, Golden Gate University. As a private institution, which grew out of the YMCA, Golden Gate University held its primary mission to be the education of career-oriented, working adults. Golden Gate also depended heavily upon tuition revenues.

Enthusiasm for his subject matter and enthusiasm for teaching were highlighted by students who evaluated Dr. Hank's classes. Students gave high evaluations to Dr. Hank. His students liked his enthusiastic lecture and discussion. His students also gave high marks to the technical subject matter of charts, indicators, forecasting, money management and investor psychology. Enrollment numbers in these classes were consistently satisfactory.

After the fourth year of teaching at Golden Gate University, Dr. Hank observed that his previous students were reregistering for his class. These were invariably the brighter, most motivated non-degree professional students. When asked why they were returning to hear Dr. Hank's lectures, they said they simply had more to learn or they really didn't get it all the first (or second) time.

Returning and neophyte students in the same class created a type of Gresham's Law. The questions and observations of the advanced students drove the participation of the new students out of circulation. Believing in the efficacy of divide and conquer, Dr. Hank handled this problem by creating a new, separate class for the advanced students. Provided they had taken the prerequisite market analysis course, students could enroll in an advanced seminar where the subject matter would change semester to semester, from one analytical topic to another.

The Problem

Students were now able to collect more complex concepts and acquire even finer tools, yet a state of uneasiness or frustration persisted. Several advanced students still felt a gap between classroom learning and practice.

Dr. Hank recognized he had a problem. The problem was the disparity between a standard of classroom performance and the capacity of students to perform on the job. As an analyst and trader himself, he also knew many of his students as professional colleagues, and he shared their standard of profitable performance on the job, instead of merely high scores on exams and a pleasant experience in class. Hence, he concluded that the persistent complaints of uneasiness and of frustration, stemming from a gap between classroom learning and practice, were a legitimate concern.

Solution - The Action Sequence

The key to reform was a shift from the paradigm of a teacher-centered/lecture-centered class to a model of student-centered/active-learning centered class. Dr. Hank abandoned his lecture and discussion approach for the intermediate/advanced course in favor of an active-learning methodology that he developed specifically for the course and that he chose to call the "Action Sequence" (see Appendix). The goal of the Action Sequence was higher order learning a la Bloom's taxonomy (1956) or the acquisition of skill and judgment.

The usual sequence of class and homework was inverted, with audio tapes, texts, and notes being studied at home as the "lecture," while in-class time was almost fully devoted to active-learning exercises via the Action Sequence. In the class, students were given a total immersion experience through repetition of action-feedback-replay sequences so that they could acquire skill and judgment through habit formation. Both the students and Dr. Hank concluded that this experiment in active learning was a successful experience, but stressful and very time consuming for everyone.

Results of a Student Survey

The class was dominated by mature, career-oriented, working adults. Over half of the class identified themselves as either proficient traders or investors or professionals in jobs that were related to the subject matter of the class. Also over one-half already possessed master's degrees, mostly in the area of finance.

Educational backgrounds of the class members included Harvard, Stanford, Boalt Hall of UC Berkeley, U.C.L.A., Bucknell and Trinity as well as Golden Gate University (GGU), S.F. State and Hayward State. Less than half the students were degree candidates at GGU.

Median age of the class members was over 40.

Overall, students believed that the class helped them to become more effective traders/investors. With respect to the Action Sequence, most students were also positive. They agreed that the Action Sequence was an appropriate methodology for the course material. Specifically they made numerous favorable comments concerning the advantages of the Action Sequence over the traditional lecture method: "doing exercise"; "like being an apprentice"; "learned I could make correct market decisions"; 'hands on"; "it involves the student much more"; "learn from mistakes; be more involved in real time situation"; "practice, feedback... reinforcement of concepts by hands on practice."

In general, these evaluations and comments strongly suggest the Action Sequence did function as an appropriate active-learning methodology.

The Action Sequence was designed to help students develop skills and judgment. How effectively did it do this? Responses suggest that the Action Sequence did aid the students to develop skills and judgment.

As we expected, the Action Sequence was perceived relatively less favorably as a method for developing comprehension. Not surprising were the student's comments on some advantages of the lecture method over the Action Sequence : "show a little clearer"; "cover more material"; "the tools are clearly described, basic functions addressed any options considered by the "operation" (Action Sequence)"; "bring instructor's focus on the most important points"; "lecture is good to go over basic concepts."

On the other hand, what was surprising was that the students nevertheless gave the Action Sequence a favorable rating with regard to its usefulness in developing their comprehension of principles and procedures. Moreover, several students wrote that the lecture method offered few benefits to one seeking to become proficient at making trading or investment decisions.

In summarizing the perceived benefits of the Action Sequence, two students' comments seem pertinent: "Active participation in the reasoning process with ready feedback for improvement" and "Committing to decisions as intervals unfolded, phase by phase. Learning through repetition and case study is an excellent method-see Harvard Business School." Other comments revealed concerns with the Action Sequence, such as: "overwhelming amount of paper"; "too much"; "rushed"; "focusing and correlating the particular set of Action Sequences with the particular set of Wyckoff principles which were emphasized"; "replay didn't seem necessary."

Things that the students wished to see expanded or changed included emphasis on collective discussion, shortening the sequences, replays done as homework, more varied and up-to-date cases, break up the tedium of long Action Sequences with mini-lectures and discussions, abbreviate and computerize the Action Sequences, charts given with feedback materials, and lectures to frame the concepts to be applied in the Action Sequences.

Summative Level: System States One and Two

It is sometimes useful to designate certain of the units of a model as the ones that exemplify the characteristics of the system state. These are what Nagel calls the state coordinates of a system. The state coordinates are often used as the descriptive terms for the particular system state. Those units of a system that are given the characterization of state coordinates are the ones that name the particular state of the system. In a more exact sense, these are the units often used as the so-called independent units (or variables) in an analytical statement. (Dubin 1978, p. 151)

The key variable in the system state shift in this study was the Action Sequence method of active learning. Indeed, the Action Sequence played the role of the "state coordinator" in the system state of active-learning/learner-centered education (see Figure 2).

The study reflects the change from one system state to a second system state; it reflects the change from a teacher-centered/lecture centered class to a student-centered/active-learning centered class. These changes are summarized in Figures 1 and 2. The diagram by Rice (1990) furnished a structure for ordering the list of system state attributes and their operational indicators while concurrently providing a visual reminder of the overlapping system of interdependence among the scholarships of integration, discovery, application and teaching.

Perceptually and logically, the linkages and balances amongst the four system elements gave rise to a holistic or summative variable referred to as the system state (Dubin, 1978, pp. 143-157). A teacher-centered/ lecture-centered class constituted one distinct system state while the student-centered/active-learning centered class constituted the other system state. Change, reformation and improvement in teaching and learning were more than simply moving from lecturing to discussion. It was a matter of a holistic paradigm shift. Change in the scholarship of pedagogy meant a shift in the system state.

Adoption of the Action Sequence method in the movement from system state one to system state two meant a concomitant inversion in the didactic-application functions. Rather than listening to lectures in class and doing problems at home, the student listened to lectures at home on audiocassettes and devoted the class period to doing problems. Consequently, this shifted the professor's role from lecturing under the "container" model of the teacher filling the student with knowledge, to the instructor assuming the "journey guide" model, wherein the teacher leads and coaches the students on a journey through the course material (Grasha, 1990, p. 34). This, in turn, caused a shift in the student from memorization and comprehension of principles and procedures to the development of skills as a consequence of experientially applying principles to concrete problems.

In other words, in this study, improvements in the mode of the applied scholarship of pedagogy, or teaching, resulted from the fruits of the scholarship of discovery, which fashioned an active-learning method called the "Action Sequence." The Action Sequence itself integrated the disciplines of market behavior and investor psychology. Students engaged in critical thinking as they used the Action Sequence format to apply principles and procedures from the Wyckoff Method to concrete market problems (Wyckoff, 1971). The findings of this empirical case that the shift in system state resulting from the introduction of a new pedagogical method tends to support the assumption that the systems model is viable for theory building in the scholarship of pedagogy.

Assessment

This study extends an assessment and teaching-learning philosophy in space and time. In the case it becomes evident that feedback from student and the standards for learning extended beyond the classroom and out into the workplace-an extension of assessment in space. Also it becomes evident that assessment led to revisions that were revolutionary rather than incremental and that took place over semesters rather than within a single semester-an extension of response in time (Cross and Angelo, 1988).

Explicit in this entire undertaking of theory, research and practice was improved student learning. The assessment of the results constituted a test of the hypothesis flowing from the theory of teaching and learning. The hypothesis stated that when active learning methodology was present, higher levels of higher order student achievement were obtained than when a passive-learning methodology was employed. Though the assessment techniques were limited and often anecdotal and even though the baseline of student performance were courses in the discipline taken 3, 5, and even 10 years earlier, the teacher-researchers were encouraged by the weight of the evidence. The Action Sequence method of active learning functioned as expected. Hence, the proposition that active-learning and superior student learning are positively related could not be rejected by the evidence gathered in this longitudinal, empirical case study.

APPENDIX
The Action Sequence Method

The practical pedagogical uses of the Action Sequence will now occupy our attention; we will for now leave behind the theory building, research methodology approaches to the Action Sequence. In a sense, we are proposing to jump from a focus on the scholarship of discovery to concentrate on the scholarship of application, within the context of the scholarship of pedagogy. What follows is a message about the Action Sequence written in a style that would presumably address the needs and interests of prospective students, especially students who are working adults.

A Message to Students

The method of the course will be the Action Sequence, an innovative instructional strategy. Business school students often have difficulty developing the skill level and personal confidence needed to take effective action beyond the classroom. This problem is especially true in such dynamic and stressful environments as the securities and commodities markets. The Action Sequence was designed to help remedy the problem of inadequate skills and confidence by engaging the student in an active learning exercise via an action-feedback-replay series, the Action Sequence. The student shall be introduced to the Action Sequence via the new student orientation workshop.

The primary objective of the new student orientation workshop will be to demonstrate to the participants what the Action Sequence is and how the Action Sequence is a particularly effective mode of active learning, especially when the outcome sought is an enhanced capacity by the student to take effective action in the world of work and heightened ability by the student to continue learning beyond the classroom.

To demonstrate the use of the Action Sequence, participants in the workshop will be engaged like students in an actual class setting. They will be given a brief memo describing some principles, and then they'll be handed an Action Sheet upon which they'll write their interpretation of some stock market data and record their choice of appropriate action. In exchange for handing in the Action Sheet, the student participant will receive a Feedback Sheet describing how an expert interpreted the situation. Participants will discuss this feedback in a small group after which the instructor will identify key points on an overhead transparency and discuss with the class the salient principles demonstrated in the exercise. Finally, student-participants will have an opportunity to rectify an error or to reinforce their learning by completing a Replay Sheet.

To demonstrate the utility of the Action Sequence, participants will be encouraged to engage in a class discussion. Among other things, the participants may give a critical appraisal of their own experience with the Action Sequence, suggest modifications to fit their own needs, or explore the underlying theory of active learning. The instructor will provide additional handouts on the Action Sequence and, if technology permits, share a videotape showing students using the Action Sequence in class.

Behind the Action Sequence stand advanced educational theories and research findings (Adler, 1984; Collins, Brown and Holum, 1991; Stigler and Stevenson, 1991; Zoll, 1969). The learning and teaching methods incorporated in the Action Sequence include critical thinking, the absorption through practice of a coherent set of principles, the application of those principles to concrete case problems, independent action by the student, the use of apprenticeship and coaching, and the effective use of errors in the process of learning by doing.

The Action Sequence in technical market analysis is a modification of the case-study method of instruction. There are several strong parallels between the Action Sequence and the case method:

- Analysis of practical problems drawn from real life situations.
- Students putting themselves in the positions of managers.
- A decision-making orientation.
- Learning by doing or an experiential approach.
- Developing within the student the qualities of understanding, judgment and communication leading to effective action.
- Building dependable self-reliance within the student.

In addition, the Action Sequence emphasizes the application of time-tested principles of market behavior to concrete case histories of market action. The student gains knowledge and skill through the practical application of substantive material of the Wyckoff Method of stock market analysis and action.

Perhaps the essential value of this dynamic education technique lies in its ability to excite interest. The student will become an active participant in the educational process instead of remaining a passive recipient. Often times our participation in education that is exciting, challenging and relevant disturbs our sense of adequacy causing us to seek self-improvement. If the educational experience provides opportunity for groping, self-discovery and the uncovering of blind spots, real change in behavior can result - back on the trading desk where it counts.

Instructions to Students

In the first four sessions of the workshop you will conduct a technical analysis of the daily vertical line chart of a market index. The period covered is December 8 of the first year until November 12 of the next year. During this period, there occur intermediate swings by covering and going long near the bottoms and selling out and making short sales near the peaks. Use protective stops on all trades. Pyramiding with a trend is sometimes advisable.

Use all appropriate Wyckoff principles and techniques at your command. This is an "open book" exercise; feel free to consult your text or notes at any time during the Action Sequence.

First, you will receive an Action Form. This form has a slice of the year's chart data. The exercise calls upon you to reconstruct the chart price and volume in your own hand in tracing paper. You are to interpret the present position and probable future trend of the market, gauging the relationships between supply and demand. Furthermore, you are requested to judge the underlying motive of the Composite Operator and to take definite action: buying, selling or remaining neutral.

In exchange for your Action Sheet, you'll be given a Feedback Sheet. The Feedback Sheet will retell what actually took place as interpreted by Mr. Richard Wyckoff or one of his associates. Discuss this feedback in a small group by comparing it to what you expected in your Action Form and by relating it back to the specific chart data.

Then you will proceed to a Replay sheet. Here you will have the opportunity to rectify past mistakes or to reinforce past successes. The Replay sheet is a version of the Action Sheet.

Action Sheet and Feedback

Figure 3 presents an Action Sheet; Figure 4 presents a Feedback Sheet. What follow below are comments by the author geared to the Action and Feedback sheets. These comments draw attention to the pedagogical principles underlying the active-learning steps taken by the students.

1. The student was encouraged to use all of his or her sensory systems in the application of principles to concrete cases: the visual chart, the recall and repetition of appropriate principles, and the kinesthetic feel by actual doing the chart reconstruction. The intention behind this was to condition the use a multiple sensory approach for fuller, deeper understanding and not simply to rely on one's favorite sensory mechanism (Gardner, 1983).
2. Two things were happening here. We were asking the student to engage in higher-order learning skills or critical thinking. We were also asking the student to actively engage in the exercise by writing down the diagnosis and prognosis. In this step and in the foregoing step the student was engaged in the application of theory to practical problems.
3. Here occurs an exercise in integrating the psychology of trading with technical market analysis. The intent was to encourage the student to disengage, to evaluate, to explain "why" and in the process gain some control over his or her own mental state while pondering upon the underlying dynamics of mass psychology in the market. Although somewhat artificial and symbolic, the concept of the Composite Operator has proven to be useful heuristic device.
4. Decision-making or choice among alternatives forced students to move from contemplation to action. The student knew full well that unambiguous feedback was on the way. The process developed judgment by forcing the student to pull together her or his internal cognition and emotions with the external verities and uncertainties into a market place decision that would have very real consequences in terms of gains and losses, both financial and psychic.
5. Feedback and Replay Steps served two functions. One was modeling. Feedback concerning what Richard D. Wyckoff (the expert) did or did not do coupled with this reflection upon the principles and procedures illustrated by the preceding case functioned as "guiding metaphor" of the master-disciple variety where the master drills students in relevant skills and they become willing apprentices (Grasha, 1990, pp 34-35).

The other function served by this Feedback/Replay was instilling a method of learning-from-mistake or learning how to learn beyond the classroom. Learning to learn is an especially desirable goal for career-oriented working adults (Zoll, 1969). During the Feedback/Replay step in the Action Sequence students represented their understanding and interpretation to each other, which added an interactive, social dimension to the learning process. It was at this stage that the professor intervened as a coach or commentator with the dyad or small groups; it was at this stage too, that the instructor would invite a class volunteer to represent the data and principles encountered earlier. The consequences for learning were to instill skill, judgment, confidence and self-reliance.

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Biography

Dr. Pruden is a professor in the School of Ageno Business at Golden Gate University in San Francisco, California, and is an active stock trader. His academic emphasis and professional interests are in the area of technical analysis and behavioral finance. Dr. Pruden is also the Executive Director of the Institute for Technical Market Analysis in affiliation with Golden Gate University. He can be reached at hpruden@ggu.edu or www.hankpruden.com

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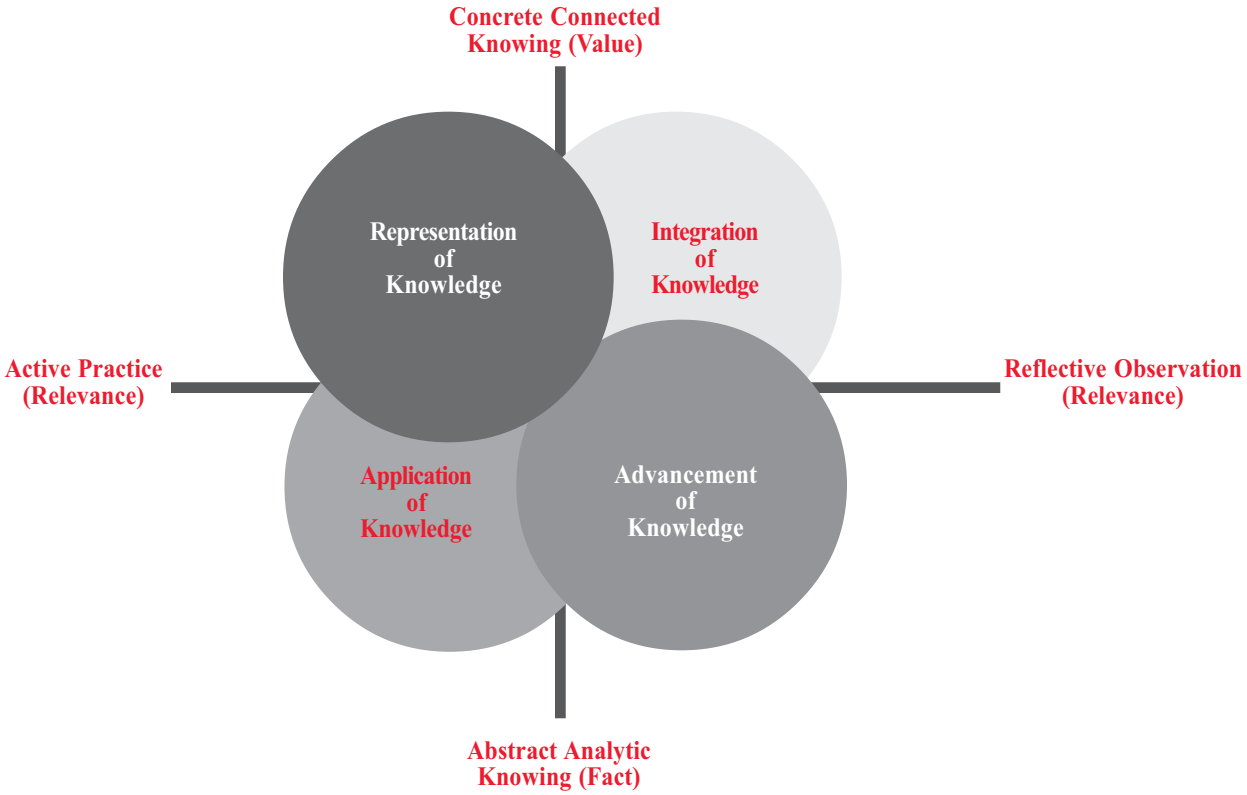
Figure 1

System State One: Teacher-Centered/Lecture Centered

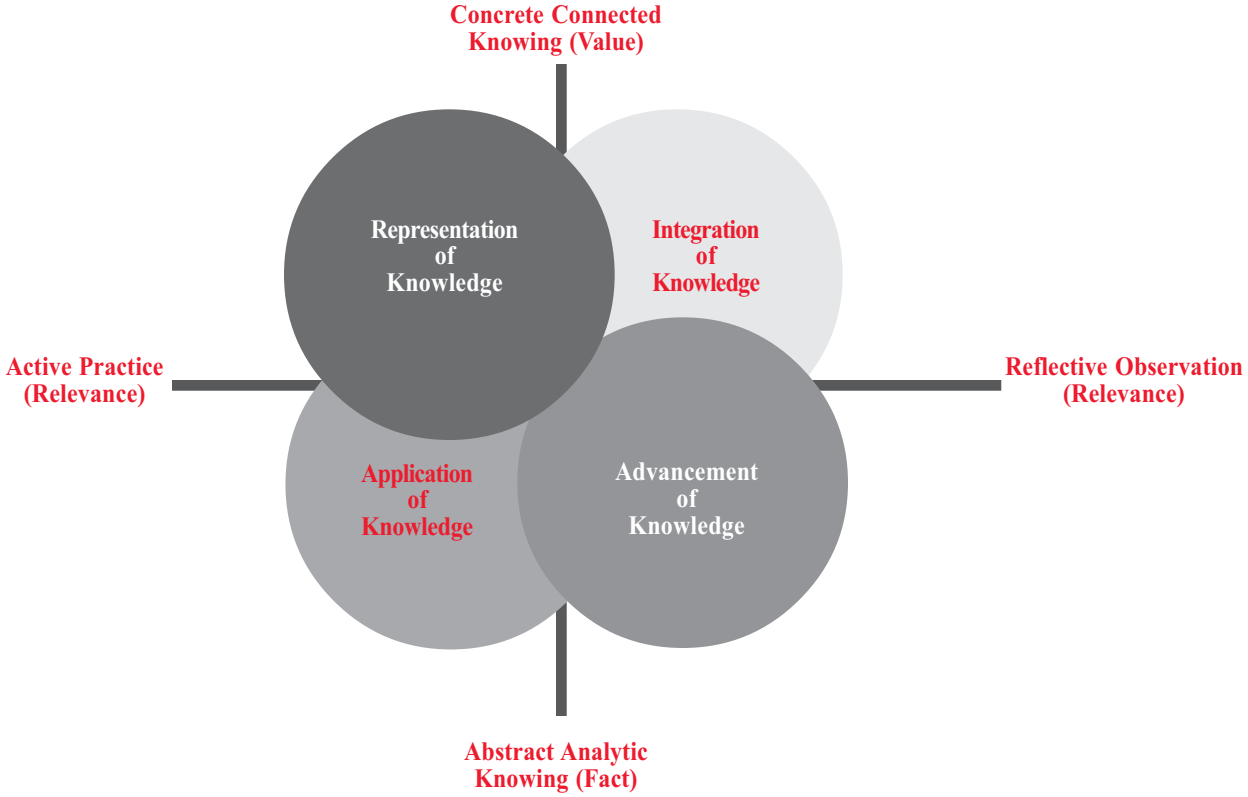


Characteristics of this Type of System

Attribute	*Operational Indicator*
Integration of Knowledge	
• Unidimensional, single discipline specific	• Textbook
• Assessment	• Multiple-choice quizzes and exams
Advancement of Knowledge	
• Content focus	• Articles witten in the discipline by professor
• Content focus	• Discipline based articles assigned to the students as part of homework
Application of Knowledge	
• Knowledge and comprehension of principles and procedures	• Course syllabus holds students responsible for recall and comprehension
• Active practice	• Teacher engaged in practice. Relates his experiences through lectures, by giving examples. Problem sets and term papers done outside of class. (Scholarship of Teaching)
Representation of Knowledge	
• Content expertise ("container model")	• Questions and answers between students and teacher
• Lecture format	• Verbalization by the teacher and notebook recordings by the students

Figure 2

System State Two: Student-Centered/Active-Learning Centered



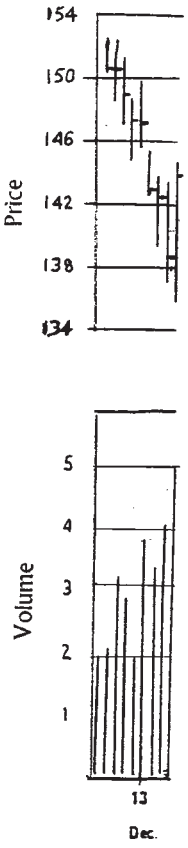
Characteristics of this Type of System

Attribute	*Operational Indicator*
	Integration of Knowledge
• Interdisciplinary; combine two or more disciplines	• Technical market analysis and investor psychology in problem sets
• Assessment	• Action-oriented decision sheets with written rationale
	Advancement of Knowledge
• Process focus	• Action feedback and reply sheets
• Content focus	• "Composite operator" and modeling an expert
	Application of Knowledge
• Problem-solving focus	• Repeated application of principles and procedures to historical cases
• Active practice	• Both students and teachers apply principles and procedures to problems outside of class (scholarship of teaching)
	Representation of Knowledge
• Process and content expertise ("journey guide")	• Teacher in coaching sessions with individuals and small groups
• Active-learning format	• Students devote class time to working through sequential problems

Figure 3

The "Action Sheet"

Instructions to a student: effective investing and trading require a bedrock of sound principles and procedures of technical analysis. The Wyckoff Method is a sound, time-tested and extremely practical method for conducting the technical analysis of financial markets. Among the principles and procedures of the Wyckoff Method covered in class will be: the supply and demand relationships, revealed by vertical line charts, to determine trends, trading ranges and turning points; the use of figure charts to determine price objectives; and the proper applications of such tools as comparative strength and weakness, volume and trendlines to analyze the market. In the course, the instructors will guide you through the Wyckoff Method via the *Action Sequence*.



1. Redraw the chart on transparency paper in your own hand to get a feel for the price and volume actions. (Verbalize to yourself in Wyckoff terms and principles your observations.)

2. Interpret the relationship between supply and demand. What is the present position and probable future of the market?

3. What is the motive of the Composite Operator?

4. Select one of the folowing and fill in the blanks:

a. Buy or go long_____with a stop at_____

b. Sell or go short at_____with a stop at_____

c. Close out an existing position at _____

d. Move the stop on an existing position to_____

e. Do nothing, await further developments

Figure 4

The Feedback/Replay Sequence

Mr. Wyckoff selected the daily vertical line chart of the New York Times Averages of 50 Stocks for this analysis. The action reflected by this chart is interpreted as follows: We use the period from December 8 to December 17 as our starting point, without regard to the market history previously recorded. This interval of nine days marked a sharp acceleration of the previous major decline, culminating in a widening spread of the daily price range and also a very marked expansion in the daily volume of trading as the market reached its low point - thereby reflecting the panicky selling which takes place under such conditions.

The volume on December 8 was around 2,000,000. This increases to 5,000,000 on the day of the low point. Tape observers would have noted the fact a large part of this volume occurred as the market recorded the extreme low and on the rally from the lows. This confirms the fact that the climax of the downward movement has actually been passed, and gives us the starting point for our next analysis. (The Wyckoff Chart would show the details of this tape action, including the feverish activity around the day's low point.) The phenomenon of the selling climax is caused by the panicky unloading of stocks (supply) by the public and other weak holders which is matched against buying (demand) of

1) experienced operators;
2) the large interests and sponsors of various stocks who now either see an excellent opportunity to replace at low prices the stocks they sold higher up, or wish to prevent further demoralization by giving the market temporary support; and
3) short covering by the bears who sense a turn.

Stocks thus become either temporarily or more lastingly lodged in strong hands. An abnormal increase in volume is one of the characteristic symptoms of a selling climax, since supply and demand must both expand sharply under these conditions. But the supply is of poor quality and the demand of good quality; and since the force of supply now will have been exhausted a technical rally ensues.

If buying on the break (i.e., during the selling climax) was principally for the purpose of supporting prices temporarily and checking a panic, or relieving a panicky situation, this support stock will be thrown back on the market at the first favorable opportunity, usually on the technical rebound which customarily follows a selling climax. This, and other selling on the rebound, may increase supply sufficiently to drive prices through the lows of the climax day and bring about a new decline, that is, resumption of liquidation.

A Moving Average Technical Trading Spreadsheet Model for Use in Teaching Technical Trading

Kristine Beck, Ph.D. and Elizabeth Goldreyer, Ph.D.

Abstract

This paper discusses how moving average technical trading strategies can be used in classroom instruction. A technical trading course could use this to demonstrate moving average trading models. In addition, investments and international finance classes could use this project to provide students with experiential learning about trading strategies that are usually not covered in detail in standard finance textbooks. We use nine different Variable Moving Average (VAMA) trading models – five models for stock market returns in Thailand and four models for currency returns in Chile. We compare these models to a simple buy and hold strategy to determine if these trading rules could generate abnormal returns.

Introduction

The use of technical analysis dates back to the 16th and 17th centuries. Some records in Amsterdam in the 16th century show use of technical analysis in tulip bulb pricing and in the 17th century in Japan when analysts used charts to plot the price of rice. Prior to the advent of detailed corporate financial data that spawned the use of fundamental analysis, analysts used stock price movements to identify patterns in predicting future market returns. In other words, a technical analyst simply uses systematic patterns in historical stock price data to predict future return. While fundamental analysis has been used predominantly for several decades, over recent years the use of technical analysis has become more commonplace, both alone and more often in conjunction with fundamental analysis. With increased computer power and literacy there has been tremendous growth in technical analysis software packages available. These are useful to all types of traders: short-term, intermediate-term and long-term.

There are still many critics of technical analysis. Belief in such a method appears to violate the efficient market hypothesis (EMH). Traditional finance literature finds that stock returns in the U.S. generally follow a random walk and characterizes such markets as being efficient in the weak form. However, several studies such as that by Lo and MacKinlay (1998) have suggested that stock price motion is not random and that the EMH may not be applicable to security prices. There have also been a sufficient number of anomalies reported in market price behavior. Each of these studies and reports has chipped away at the 30-year dominance of the EMH in the investment industry and in academia.

Another contention is that technical analysts interpret the same data differently. Several technical analysts may look at the same chart yet disagree about the message. However, fundamental analysts do the same thing. Fundamental analysts may examine economic or company information and disagree on the meaning of that information. While many academics and finance textbooks do not support the use of technical analysis, it is used in conjunction with fundamental analysis in most investment houses. This fact alone provides motivation to use this exercise with finance students.

While the result of research in developed markets is mixed regarding weak form market efficiency, there is a greater amount of research that shows lack of market efficiency in lesser developed, or emerging markets. Stock returns in many emerging economies exhibit systematic patterns through the presence of strong serial correlation. Harvey (1995a) asserts that it is this presence of strong serial correlation in the stock returns that render them more predictable. However, predictability does not necessarily imply market inefficiency, where trading strategies lead to economic profits. We use data from emerging markets to apply technical trading rules (although any markets could be used in this exercise).

We examine both stock market returns and currency returns in emerging markets. There is a large amount of research in technical trading in stock market returns. However, technical analysis is often used in currency markets as well. Allen and Taylor (1990) report that over 90% of the participants in the London and Hong Kong markets rely on technical trading strategies to predict currency prices. This indicates that expectations about currency prices can be distilled with some accuracy using some form of technical trading rules.

Technical analysis is based on the idea that prices move in trends that are determined by the changing attitudes of investors toward a variety of economic, monetary, political, and psychological forces. The goal is to identify a trend reversal at a relatively early stage and ride it until the evidence shows that the trend has reversed. Technical analysis can be broken down into three general areas: sentiment, flow-of-funds, and market structure indicators. Sentiment indicators monitor the actions and beliefs of different market participants. Flow-of-funds indicator analyzes the financial position of various investor groups in an attempt to measure their potential capacity for buying or selling stocks. The type of technical trading that we will be modeling in this paper, moving averages, falls into the third category – market structure indicators. This area monitors the trend of various price indexes, market breadth, cycles, volume, etc., to evaluate the health of the prevailing trend.

A moving average (MA) smoothes out the fluctuations of any price or return series into a less distorted trend. There are three general types of MAs: simple, weighted, and exponential. The simple MA is by far the more the widely used model. The latter two apply more weight to more recent data. We discuss a version of the simple MA, the variable moving average (VAMA), in this paper. A VAMA consists of the comparison of two simple moving averages, a longer and shorter. Signals are generated by the short-term MA crossing above or below the longer-term MA. Note that changes in the price trend are identified by the shorter-term MA crossing its long-term MA, not by a reversal in the direction of the MA. This procedure has the advantage of smoothing the data twice.

This paper describes a methodology that finds successful moving average models on past data. However, it does not test the models on out of sample data to determine if they are successful in predicting returns. Other tests are necessary before one can be confident as to the model's predictive value.

Literature Review

Practitioners' main criticism of academic research of technical trading is that academics test sophisticated statistical techniques as opposed to the techniques that are being used by technicians [Bauer and Dahlquist (1999)]. Joy (1986) supports their argument, stating that technical trading methods have not been adequately tested and suggests that until there is conclusive evidence of the efficiency of markets, these and other trading strategies should be considered. Most testing by academics focuses on testing the EMH, or randomness in stock market prices. They conclude that if markets are efficient, then profits cannot be made from technical trading. The following reviews academic studies on technical trading in stock markets and in currency markets (in developed and emerging markets).

Technical Trading in Stock Markets

Early studies on the U.S. stock market indicate support for the random walk hypothesis [Roberts (1959) and Brealey (1969)]. Subsequent papers highlight

anomalies in not only the U.S. but also in several international equity markets [Cadsby and Ratner (1992)]. Recent papers find several seasonalities in emerging equity markets and thus reject the random-walk hypothesis [Agrawal and Tandon (1994), Aggarwal and Rivoli (1989), and Urrutia (1995)]. The presence of systematic patterns implies that technical trading rules can be deployed to exploit such patterns. Fama and Blume (1966) and Jensen and Benington (1970) show that once trading costs are considered, technical trading rules do not provide abnormal profits in the U.S. equity markets. Other studies on the U.S. market, however, contend that potential profits depend on the level of transaction costs [Sweeney (1988) and Brock, Lakonishok and LeBaron (1992)]. Patterns in stock price movements – large increases or decreases in one time period followed by a reversal in the next time period – that are frequent enough to create profit opportunities for technical traders have also been detected [Lehmann (1990) and Jegadeesh (1990)].

We selected two emerging markets to test VAMA models. If technical trading profits are uncovered for some developed markets they are more likely to be present in emerging markets. Emerging markets have a greater chance of being inefficient due to lack of liquidity and the significant barriers to private investing. Bessembinder and Chan (1995) and Ratner (1999) find potential for profitability in some Asian equity markets after considering trading costs using methodology similar to Brock et al. (1992). Ratner (1999) reports markets in Taiwan and Thailand to have relatively low trading costs, high turnover, and significant first order autocorrelation. Ahmed, Beck and Goldreyer (2000) find that the equity markets of the Philippines, Taiwan and Thailand have predictable patterns in their market returns yielding significant positive profits during major market changes. The Harvey (1995a) study lends insight into why technical trading rules may be successful in emerging equity markets. He finds that autocorrelation of stock returns in emerging markets is much higher than in developed markets. Finally, Harvey (1995b), Erb, Harvey and Viskanta (1996), and Diamonte, Liew and Stevens (1996) are all somewhat successful in predicting emerging market returns using various risk factors.

Technical Trading for Currencies

While technical trading was originally developed for the use in commodities, it has been extended to several other financial markets, including stock, bond, currency and futures markets. Several studies have documented serial dependency for exchange rates in developed countries [Kritzman (1989), Taylor (1992) and (1994), and Levich and Thomas (1993)]. Their work shows that a weak currency has a tendency to continue to weaken and strong currency has a tendency to strengthen. Arnott and Pham (1993) consider forward currency markets and Bracker and Morran (1999) examine currency futures in developed countries and find some recurring patterns that can provide abnormal profits using simple filter and moving average trading rules. However, Murphy (1986) studied sixteen technical futures funds and found no statistically significant evidence that any of these funds outperformed a simple buy-and-hold strategy.

Levich and Thomas (1993) employ Brock, Lakonishok and LeBaron's (1992) bootstrap approach to determine the significance of technical trading profits. They find in some developed countries a significant profit level is highly unlikely. Osler and Chang (1995) consider a more complex technical analysis called the head-and-shoulders pattern to find significant profits in six developed currencies. Neely, Weller, and Dittmar (1997) and Neely and Weller (1999) examine a genetic programming approach to technical trading and report significant profits using this methodology.

To predict short run movements in currencies, finance theory suggests the use of the unbiased forward rate hypothesis – the forward (futures) rate is an unbiased predictor of future spot rates. However, most currencies of emerging economies do not have an active futures or forward market, which makes the study of technical trading rules more important for these currencies than for developed market currencies. Ahmed, Beck and Goldreyer (2002) test the efficacy of using trading rule strategies for currencies of emerging economies. They find that emerging currency markets have predictable patterns in their market returns yielding significant positive profits.

Data

Our example data set consists of daily local closing stock prices from The Stock Exchange of Thailand (SET) index from February 1994 to March 1999, and spot exchange rates from Chile (per U.S. dollar) from January 1990 to November 2000.[1] Trading costs are incorporated for Thailand's tests, but not for Chile's tests. This Excel exercise could be done by the whole class on the same markets, or professors could give each group a different market to cover.

Data Analysis

The trading rules taught to students in this exercise for stock market returns are similar to those used by Brock, Lakonishok, and LeBaron (1992). We use five VAMA models with the Thai stock market index and four VAMA models with Chilean currency returns. The stock market VAMA rules are as follows: 1-50, 1-150, 5-150, 1-200, 2-200, where the 1, 2, and 5 represent the number of days in the short moving average, and the 50, 150, and 200 represent the number of days in the long moving average. The currency market VAMA rules are as follows: 1-30-0, 1-30-1, 1-50-0, and 1-50-1 where the first number, 1, represents the number of days in the short moving average, the second number, 30 or 50, represents the number of days in the long moving average, and the third number represents a trading band of zero or one standard deviation.

There are two major differences between the VAMA models chosen for stock market versus the currency market. First, the number of days in the long moving averages is much shorter for the currency market because stock markets are more volatile and do not trend as well as currency markets. Second, we use a trading band in the currency market VAMA models; this trading band could also be used in the stock market models. The effect of trading bands is to reduce the number of trades and thus be more cost effective. Ratner (1999) reports no major differences in his conclusion about the efficacy of a trading model in the presence or absence of a trading band. Tests without trading bands are biased against the rules: if a trading rule is successful without a trading band, it is also likely to be successful with one.

A *buy* position is a long position in the stock or currency, and a *buy* signal is indicated when the short moving average exceeds the long moving average:

$$\frac{\sum_{s=1}^{S} R_{i,t}}{S} > \frac{\sum_{l=1}^{L} R_{i,t-l}}{L} = Buy \qquad (1)$$

where $R_{i,t}$ is the daily return in period S (1, 2, or 5 days), and $R_{i,t-l}$ is the return used to compute the long average over period *L* (30, 50, 150 or 200 days). Returns from stock market data are inflation adjusted, while exchange rate data returns are not.[2] This test is repeated daily with the moving averages changing throughout the sample. The *buy* position is maintained until a *sell* signal is indicated by the long position exceeding the short position. With the *sell* signal, the investor is not short, but out of the market. A rule is determined to be effective if the average *buy* minus *sell* (*buy-sell*) signal is positive and greater than a buy and hold alternative. If trading costs are considered, *buy-sell* must be positive and larger than a buy and hold alternative after including trading costs [*buy-sell (net)*].

$$\frac{\sum_{s=1}^{S} R_{i,t}}{S} < \frac{\sum_{l=1}^{L} R_{i,t-l}}{L} = Sell \qquad (2)$$

We include trading bands in the currency markets to demonstrate their use. Brock, Lakonishok, and LeBaron (1992) and others evaluate each trading rule with a band of zero and one percent of returns.[3] While this band may be reasonable for developed markets, it does not account for the large differences in volatility in emerging markets. Ratner (1999) suggests employing a trading band of zero and one standard deviation. With the zero band, each return generates either a *buy* or *sell* signal, while a band of one standard deviation would

generate a *buy* or *sell* signal only when the short moving average crosses the trading band. The current buy or sell position is maintained until the short average crosses the trading band again from the opposite direction. Equation (1) is modified as follows for *buy* signals:

$$\frac{\sum_{i=1}^{S} R_{i,t}}{S} > \frac{\sum_{i=1}^{L} R_{i,t-i} + \sqrt{\frac{n\sum_{i=1}^{n} R_{i,t}^2 - (\sum_{i=1}^{n} R_{i,t})^2}{n(n-1)}}}{L} = Buy \qquad (3)$$

where n is the number of daily returns in each series. (For *sell* signals, "<" would replace ">" in equation 2).[4]

Excel Example

Exhibit 1 shows how buy and sell signals are calculated given percentage daily return data for the Thailand SET. The closing prices are given in column B. Column C shows the daily percentage return for the index. An IF STATEMENT can then be used to calculate the signal using formulas (1) and (2). This is demonstrated for the (1,50,0) signal in column D. This trading rule has one day in the short moving average, 50 days in the long moving average, and no trading band. For example, if the signal in cell D51 is "BUY," a buy would occur on the next day (at the price in cell B52), and the first daily return would be on the day after (cell C53).

The signal information can then be used to calculate buy-sell returns. These formulas are shown in columns E, F, G, and H for the (1,50,0) rule. Columns E and F are used to determine whether the signal is buy, sell, or hold. A trade will be initiated only if there is a change in the signal. Columns G and H quantify the buy and sell returns. After the buy and sell returns are determined, students can calculate the number of buy signals, the number of sell signals, the number of trades, and the buy-sell return for each rule. Profits net of trading costs can be determined by multiplying the number of trades by the average trading cost and subtracting from the returns.

Results

Previous studies found emerging markets to have significant autocorrelations along with low liquidity for both stock and currency markets. This introduces an element of inefficiency into the markets rendering them susceptible to predictable patterns exploitable by technical trading rules. Results in this study show the presence of substantial returns by pursuing buy and sell signals from the trading rules in the stock market in Thailand (even after trading costs are considered) and in the currency market of Chile. The results are provided in Table 1.

The rules for both panels are in the following order: number of days in short moving average, number of days in long moving average and finally the standard of the trading band. The trading rules used on stock market returns in Thailand (Panel A) did not have trading bands. However, two of the four trading rules in Panel B on currency returns in Chile do use trading bands.

To facilitate comparison of the VAMA trading rule profits with those from a naïve buy and hold strategy, each panel presents the holding period return during the entire period and the average annual buy-hold return. Panel A also provides the trading costs in Thailand. For each VAMA rule, the number of buy signals, sell signals and trades are provided in the first few columns (columns 2-4). Columns 5 and 6 show the annualized returns from the buy and sell signals generated by the VAMA trading rules. The differences between the buy and sell returns are averaged over time and provided in the 7th column. For the VAMA trading rules to be effective before trading costs over time, the average buy return should be significantly higher than the average sell return, i.e. the number in column 7 should be positive. The sell signal in this trading rule does not imply selling the asset short, but indicates an exit strategy from the market. The Thai example (Panel A) considers trading costs in the 8th column. If this is a positive number, the rule is effective even after considering trading costs.

Panel A: Thailand's Stock Returns

Thailand experienced a severe bear market during the sample period, as indicated by the negative buy and hold percentage return and annualized return. The buy returns were greater than the sell returns for three VAMA rules (column 7); thus these rules were profitable before trading costs during this sample period.

Transaction costs play an important role in determining the efficacy of any trading rule, especially if they are high. Many of these trading rules lead to a large number of trades. The VAMA return of buy minus sell is reduced by the transaction costs of each trade. The transaction costs represent one-way estimates. The average cost per trade, provided by Willoughby (1997), is assumed to be constant. Column 8 provides the annualized estimates of the VAMA return reduced by the cost of each trade for Thailand. Only two trading rules are profitable after considering trading costs.

To determine if the VAMA rules should be used in these markets, a final comparison should be made: annualized buy-hold return versus the returns provided by the VAMA rules (column 7 before trading costs or column 8 after trading costs). For Thailand, comparison of profits from a naïve buy and hold strategy with those from using VAMA trading rules show that technical trading yields better profits even after considering transactions costs. Over a four-year period from 1994 to 1999 this market lost 76 percent of its inflation-adjusted value. Moreover, its average annual buy and hold return was -22.10%. Using all the VAMA rules and averaging the results yields annualized profit of 37.29% before costs and 23.75% after transaction costs. This result is indeed very dramatic and perhaps is the most impressive showing of a technical trading rule. The (2,200,0) and the (5,150,0) rules yield very large positive profits in a tremendous bear market. Under these two specific rules, technical trading yields an annualized profit of over 80%.

Panel B: Chile's Currency Returns

Transaction costs were ignored for Chile's currency returns, as foreign exchange transactions costs are fairly low. This sample period of 10 years is much longer than the Thailand SET sample of four years. The annualized buy and hold return for this period was 6%. All four VAMA models are effective and profitable. The average annual return from the four models is 9.7%, which is higher than the buy and hold return. In fact, all four of the models outperformed the buy and hold strategy. The profits are substantially large such that transactions costs would not diminish the statistical and economic significance.

Conclusions

Students entering the field of investments need to be familiar with, and preferably knowledgeable in, technical trading since most investment houses use this type of analysis to some extent. This paper provides an exercise of applying variable moving average trading rules, which is a common technique of technical analysis. Students typically become more interested in and educated on a subject if they can apply it in an exercise. Professors can use this exercise in an investment or international finance class. In addition, statistics, economics, or information technology professors could use this for an applied example of the moving average techniques. The markets included in this study demonstrate superior results over several other emerging markets we tested. Studies using VAMA models in other markets, especially developed markets, will likely not deliver such successful results.

Exhibit 1 Excel Example

Calculations for daily returns on the Thailand SET, trading signals, and buy and sell returns. A trade is generated only if the signal changes. After the buy and sell returns are determined, the number of buy signals, the number of sell signals, the number of trades, and the buy-sell return for each rule can be quantified.

	A	B	C	D	E	F	G	H
	Date	Closing		Signal	Trading generated from (1,50,0) rule:			
		Price	% return	(1,50,0)	N(Buy)	N(Sell)	Buy return	Sell return
26	01/25/99	363.36	-0.03485					
27	01/26/99	366.77	0.00938					
28	01/27/99	373.25	0.01767		Daily percentage return			
29	01/28/99	366.16	-0.01900		=(B27-B26)/B26			
30	01/29/99	363.00	-0.00863					
31	02/01/99	358.84	-0.01146					
32	02/02/99	347.21	-0.03241					
33	02/03/99	338.20	-0.02595					
34	02/04/99	338.27	0.00021					
35	02/05/99	337.96	-0.00092					
36	02/08/99	330.77	-0.02127	This formula determines whether the signal is buy or sell				
37	02/09/99	320.36	-0.03147	Without trading band:				
38	02/10/99	314.74	-0.01754	=IF(C54>SUM(C5:C54)/50,"BUY","SELL")				
39	02/11/99	313.65	-0.00346					
40	02/12/99	347.43	0.10770					
41	02/15/99	344.96	-0.00711					
42	02/16/99	350.36	0.01565					
43	02/17/99	338.02	-0.03522					
44	02/18/99	336.47	-0.00459					
45	02/19/99	336.57	0.00030		This formula quantifies the buy signals			
46	02/22/99	334.52	-0.00609		=IF(AND(D56="SELL",D57="BUY"),1,"")			
47	02/23/99	333.71	-0.00242					
48	02/24/99	336.17	0.00737					
49	02/25/99	332.67	-0.01041				This formula gives the	
50	02/26/99	340.94	0.02486				return generated by	
51	03/02/99	338.82	-0.00622				the trading rule	
52	03/03/99	341.51	0.00794				=IF(D56="BUY",C58,"")	
53	03/04/99	337.14	-0.01280					
54	03/05/99	336.21	-0.00276					
55	03/08/99	336.68	0.00140	BUY				
56	03/09/99	329.59	-0.02106	SELL				
57	03/10/99	333.28	0.01120	BUY	1		0.0016801	
58	03/11/99	345.21	0.03580	BUY			0.0436392	
59	03/12/99	345.79	0.00168	BUY			-0.016432	
60	03/15/99	360.88	0.04364	BUY			0.005212	
61	03/16/99	354.95	-0.01643	SELL		1		0.0171244
62	03/17/99	356.80	0.00521	BUY	1		0.0131713	
63	03/18/99	362.91	0.01712	BUY				
64	03/19/99	367.69	0.01317	BUY				

Table 1
Panel A: Thailand - Stock Returns

Buy and Hold over from February 1994 to March 1999 = -76.24%
Average 1 year buy and hold return = -22.10%
Trading Costs = 0.938% per trade

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Test	N(Buy)	N(Sell)	N(Trades)	Buy*	Sell*	Buy-Sell*	Buy-Sell (Net)*
(1,50,0)	744	800	721	-29.29	-33.34	4.05	-13.63
(1,150,0)	723	821	691	-36.03	-30.75	-5.28	-22.35
(1,200,0)	739	805	689	-32.12	-25.80	-6.32	-23.05
(2,200,0)	677	867	425	39.20	-75.61	114.80	105.24
(5,150,0)	676	868	277	41.41	-37.81	79.22	72.53
Average						37.29	23.75

Panel B: Chile - Currency Returns

Buy and Hold over from January 2, 1990 to November 10, 2000 = 93.50%
Average 1 year buy and hold return = 6.04%
Total Number of returns = 2,763

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Test	N(Buy)	N(Sell)	N(Trades)	Buy*	Sell*	Buy-Sell*
(1,30,0)	1289	1444	1245	10.8	2.5	8.3
(1,30,1)	1248	1485	1221	11.6	2.0	9.6
(1,50,0)	1285	1428	1203	11.7	1.0	10.7
(1,50,1)	1252	1461	1203	11.6	1.4	10.2
Average						9.7

*Annualized returns in percentages.

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Footnotes

1. *Data provided by Global Financial Data (www.globalfindata.com).*
2. *Global Financial Data also provided us with monthly inflation rates. Inflation rates allow computation of returns adjusted for inflation. Given sustained periods of high inflation in many emerging markets, it is necessary to use real returns to test the efficacy of each trading rule for stock returns. The adjustment is not as important in markets with lower inflation rates. Dividing the monthly inflation rate by 20 estimates the daily weekday inflation. The equation below estimates the daily real returns as the difference between the daily nominal return and the daily inflation rate:*

$$R_{i,t} = \left(\frac{R_{m,t} - R_{m,t-1}}{R_{m,t-1}} \right) - \left(\frac{\inf_{i,T}}{20} \right)$$

where $R_{i,t}$ is the inflation adjusted return for country i on day t, $R_{m,t}$ is the closing stock market index for country i on day t, and $inf_{i,T}$ is the monthly inflation for country day t in the appropriate month (T). The results in Table 1 reflect an inflation adjustment for the Thai stock returns, but no adjustment for Chilean currency returns. The Excel example in Exhibit 1 also does not include an inflation adjustment.

3. *Bessembinder and Chan (1995) use a zero and one percent trading band for Southeast Asian emerging markets. A trading band of one standard deviation would generate fewer trades, be more cost effective, and account for the differences in country volatility more accurately than the one percent band.*
4. *This exercise does not demonstrate whether the buy-sell returns are significant since this is a difficult and time-consuming process. Finance classes would probably not want to do this, while higher-level statistics or econometrics classes might find this interesting and worthwhile. Simulated p-values must be calculated using bootstrapping to correct for dependencies in non-normal return data. The bootstrap procedure involves forming a simulated series by scrambling the returns and sampling with replacement from the original series. The trading strategies are then applied to the simulated series and the mean* buy *and* sell *returns are computed for each iteration. This process is repeated at least 500 times to form a distribution of mean returns. Simulated p-values calculate the proportion of returns that are greater than those computed with the actual series. The VAMA* buy-sell *rules are judged to be effective if the simulated* p*-values are less than* α*=.05. [See Brock, et al. (1992) for a detailed description of this procedure.]*

Biographies

Professor Beck is an Assistant Professor at University of Wisconsin at Oshkosh. She received her doctorate at the Florida State University in 1995. She currently teaches investments and international finance at the University of Wisconsin Oshkosh. Her research interests include international markets and quantitative methods. She has other papers in the area of technical trading that have been published and/or presented at conferences.

Professor Goldreyer is an Associate Professor at the University of Denver, Reiman School of Finance. She received her doctorate at the University of Texas at Arlington. She teaches investments and international finance at the University of Denver. Her research interests include international investments, mutual funds, and technical trading. She also has other papers that have been published and/or presented at conferences on technical trading of currencies and equities, both domestic and international.

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Notes