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ABSTRACT

Fifty core tasks that are generally performed by and important for secondary school beginning teachers are identified. Participants (n=297) were asked to judge the importance of each task. College students (n=476) were asked how confident they would be in doing these tasks as if they were beginning teachers. Rasch technique was used to scale the importance and confidence of the tasks. Most of the teachers considered these tasks important, especially those pertaining to "guidance and counseling." Most of the college students considered themselves very confident in doing these tasks, especially those related to "planning and preparing for instruction." They felt less confident about the tasks pertinent to "classroom management." Nine tasks were identified as important but relatively difficult to accomplish. The curriculum for teacher education should make efforts to cultivate the corresponding skills and knowledge for these nine tasks. The applications of this study to college students, institutions offering teacher education programs, and secondary schools are addressed. (Contains 2 tables, 6 figures, and 17 references.) (Author/SLD)

Rasch Analysis of Core Tasks for Secondary School Beginning Teachers in Taiwan

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Abstract

Keywords: core tasks, job analysis, Rasch model, secondary schools, beginning teachers

Fifty core tasks that are generally performed by and important for secondary school beginning teachers are identified. Two hundred and ninety-seven secondary school teachers were asked to judge the importance of each task. Four hundred and seventy-six college students were asked how confident they would be in doing these tasks as if they were beginning teachers. Rasch technique was used to scale the importance and confidence of the tasks. Most of the teachers consider these tasks important, especially those pertinent to "guidance and counseling." Most of the college students consider themselves very confident in doing these tasks, especially those pertinent to "planning and preparing for instruction." They feel less confident to the tasks pertinent to "classroom management." Nine tasks are important but relatively difficult to accomplish. The curriculum of teacher education should make efforts to cultivate the corresponding skills and knowledge for doing these nine tasks. The applications of this study to college students, institutions offering teacher education programs, and secondary schools are addressed.

In Taiwan, before 1994, only teacher colleges were allowed to offer teacher education programs. Those who wished to become elementary or secondary teachers had to enter these colleges. From then on, almost all colleges can offer these programs. Since the enrollments are very limited, it is very competitive for college students to enter the programs. Some enrolled students even dropped out partly because of their personal reasons or academic problems. This is not only a personal waste but also a waste of educational resources. Deciding to apply the teacher programs indicates committing oneself to teaching career. College students have difficulties in deciding whether to apply the programs or not because they do not fully understand what teachers usually do in the secondary schools. If they are provided with this kind of information and with what are needed to perform these tasks, their decisions will be more effective.

On the other hand, the admission offices of the teacher programs struggle in selecting appropriate applicants. The committees wish to select college students with strong motivation and aptitude, of course. However, without solid selecting criteria, some of the programs accept applicants merely through randomization or grade point average. Consider the problems that secondary schools have. Beginning teachers were assigned to secondary schools by the Ministry of Education, Taiwan before 1994. From then on, the schools take all the responsibility and thus have the same difficulties as the teacher programs have in selecting applicants.

To resolve these problems, the first step we have to take is to identify "core" tasks of beginning teachers and enable skills they need. With identification of these core tasks, college students are able to assess their own interests, skills, and aptitudes to these tasks before making decisions. The admission committees of both teacher education programs and secondary schools are able to develop instruments or formulate strategies for personnel

selection. In the meantime, the curriculum of teacher programs can be revised to cultivate the corresponding skills and knowledge. Secondary schools are able to conduct pre- or in- service training to increase instructional effectiveness.

The purpose of this study is to identify major tasks for secondary school beginning teachers. Since different subject matters (e.g., language, mathematics, and social sciences) or school levels (i.e., kindergarten, elementary schools, and colleges) require somewhat different job skills, we focus on the general core tasks for all secondary school beginning teachers. In addition, we ask college students to assess their confidence in doing these tasks as if they were beginning teachers. Rasch technique (Rasch, 1960) is used to scale the importance and the confidence of the tasks. These two scales are compared to identify those tasks that are important but relatively difficult for college students. Efforts should be made to cultivate the corresponding skills and knowledge for doing these tasks in both teacher education programs and secondary schools.

Job Analysis

The importance of job analysis on human resource management has been widely recognized (Byars & Rue, 1984; Ghorpade, 1988; Mathis & Jackson, 1985; McCormick, 1979; Schippmann, Hughes, & Prien, 1987; Schneider & Konz, 1989; Thompson & Thompson, 1982; Veres, Lahey, & Buckly, 1987; Wilson, 1974). According to Ghorpade and Atchison (1980), job analysis is a management activity. Through investigating and analyzing the nature of a job, the results can be regarded as the foundations of organization planning and human resource management. Job description, demand of the employee, criteria of job performance, or even job distribution can be done based on the analysis. It can also be a basis to select, train, or promote employees. A complete job analysis for personnel selection contains the following four major steps (Anastasi, 1990):

1. Conducting a job analysis to identify the major job elements and specify the corresponding skills, knowledge, and other worker traits required by the job.
2. Selecting or constructing tests to assess the characteristics specified in Step 1.
3. Correlating each test with appropriate criteria of job performance and choosing tests for the final battery.
4. Formulating a strategy for personal decisions, i.e., determining how scores on the chosen tests will be used in making operational decisions.

Job analysis for teacher license tests has been conducted (Mehrens, 1987; Shimberg, 1982; Vertiz, 1985). The Educational Testing Service introduces a new generation of teacher assessments: The Praxis Series: Professional Assessments for Beginning Teachers, as part of the process of licensing or certifying teachers. Three job analysis studies were conducted to provide data for this system. Each study was conducted in two phases. Phase I aimed at establishing an initial inventory of tasks. Phase II was a large-scale survey to educational professionals. Rosenfeld, Thornton, and Skurnik (1986, 1992) and Rosenfeld and Tannenbaum (1991) have reported job analysis studies of secondary school level. These studies identified a pool of tasks that were judged to be performed by and important for newly licensed teachers. Eighty-seven tasks were identified and were clustered into six dimensions: (a) planning and preparing for instruction, (b) managing student behavior in the classroom, (c) implementing instruction, (d) evaluating student learning and instructional effectiveness, (e) non-instructional responsibilities, and (f) additional professional activities. Respondents are 3136 teachers, 183 administrators, and 234 teacher educators. Most of these 87 tasks were judged to be performed by newly licensed teachers. Fifty tasks were judged to be very important by all respondents. Most of them were clustered in the first four dimensions.

Raths (1971) analyzed the function of the teachers and indicated that teachers have the

following eleven functions: (1) explanation, report, and display, (2) inspiration, guidance, and administration, (3) group management, (4) security offering, (5) value clarification, (6) learning difficulty finding, (7) material design, (8) grade assessment, record and report, (9) interaction enhancement between students, (10) classroom organization and management, (11) school activities attendance, and (12) professional and civil activities involvement.

In Taiwan, research of job analysis for teachers is very limited. Ko and Wu (1993) investigated elementary school teachers on three facets: pre-class preparation, in-class teaching, and post-class review. It was found that most teachers consult only teachers' manuals for preparing the class. Teachers have to deal with triviality that is not related to teaching at all, such as policy delivery and political election. Lin (1992) showed that elementary teachers not only have to do the routine instruction but also get involved in many kinds of activities on and off campus, including teacher training, administrative affairs, instruction assessment, art activities, sports and recreation, festival celebration, environmental protection and health care, social work service, and guest visiting. The Employment and Vocational Training Division, Council of Labor Affairs, Executive Yuan (1991) and the Employment and Vocational Training Division, Council of Labor Affairs, Executive Yuan and the Department of Labor Affairs, Taiwan Provincial Government (1995) made an initial job analysis for several occupations including teachers. However, the research did not make specific job statements for secondary school teachers.

Rasch Measurement

In this study, two inventories on a four-point scale were developed. One is to assess importance of the core tasks for beginning teachers; the other is to assess confidence of college students in doing these tasks. An extension of the Rasch model (Rasch, 1960), the partial credit model (Masters, 1982), was applied. Let θ_n denote person n's ability, p_{ij} the

probability of scoring j in item i, p_{ij-1} the probability of scoring j - 1 in item i, and δ_{ij} the jth step difficulty of item i. According to the partial credit model:

$$\log\left(\frac{p_{ij}}{p_{ij-1}}\right) = \theta_n - \delta_{ij}.$$

The step parameters δ_{ij} can be reparameterized as an overall item difficulty and a set of threshold difficulties (Andrich, 1978):

$$\delta_{ij} = \delta_{i\cdot} + \tau_{ij},$$

where $\delta_{i\cdot}$ represents the overall difficulty of item i, and τ_{ij} represents the jth threshold difficulty of item i. The overall difficulty is in fact the average of the step difficulties. The threshold difficulties are the deviations of the step difficulties to the average. This Andrich's (1978) formulation has the advantage that $\delta_{i\cdot}$ can be treated as the single index of item i. After all, each item has a single index is more intuitively reasonable than many indices.

Method

Following Rosenfeld and Thornton, and Skurnik's (1986, 1992) and Rosenfeld and Tannenbaum (1991) research works, we first interviewed five secondary teachers and summarized 104 tasks that are important for secondary school beginning teachers. They are clustered into seven dimensions: (a) Planning and preparing for instruction, (b) classroom management, (c) implementing instruction, (d) instructional assessment, (e) guidance and counseling, (f) additional professional activities, and (g) administrative affairs. Three testing experts, five educators, ten secondary school teachers, and ten college students were surveyed to insure that all important aspects were included and the statements of the tasks were clear. Ninety-nine tasks were then identified. They were administered to 23 secondary school teachers to evaluate their importance and amount of time spent in doing for beginning teachers. Finally, the most important fifty tasks were formed, which are clustered into six

dimensions, shown in Table 1. The last dimension, (g) administrative affairs, was discarded because of less importance and less time spent in performing.

Table 1. Numbers of items administrated

Dimension	Draft version	Final version
A. planning and preparing for instruction	13	5
B. classroom management	19	8
C. implementing instruction	21	11
D. instructional assessment	9	6
E. guidance and counseling	16	15
F. additional professional activities	8	5
G. administrative affairs	18	0
Total	104	50

These 50 tasks were administered to 297 secondary school teachers to evaluate the importance for beginning teachers on a four-point scale. This is referred to as the "importance" scale. They were also administrated to 476 college students (including those were taking teacher education programs) to evaluate how confident they would be in performing as if they were beginning teachers on a four-point scale. This is referred to as the "confidence" scale. These two scales were analyzed with the partial credit model. For both scales, the higher score the item has, the more important it is or the more confident the subjects are in doing it. The overall difficulties are used to represent the importance or the confidence of the tasks. The smaller the overall item difficulty is, the more important the task or the more confident the subjects are on it.

Results

Model-Data Fit

Consider model-data fit of the importance scale. According to the weighted mean square error (INFIT MNSQ, Wright & Masters, 1982), most items fit the partial credit model fairly well, as shown in Figure 1. We use $1.0 \pm .3$ as fit criterion. However, it should be noted that

model-data fit is a matter of degree rather than all or none. Three out of the fifty items are considered marginally bad-fitting:

B9: Document, discourage, discipline, or correct student misbehavior

B12: Adopt proper procedures or personnel to help documenting, discouraging, or correcting student misbehavior.

F50: Supervise or instruct student on- or off- campus competition.

Figure 2 shows the fit statistics of the confidence scale. Two items are considered marginally bad-fitting:

B7: Monitor student in-class behavior by physical proximity, eye contact, or moving about classroom to maintain order.

B12: Adopt proper procedures or personnel to help documenting, discouraging, or correcting student misbehavior.

Since the badness-of-fit of the five items are marginal, they are kept in the following analyses.

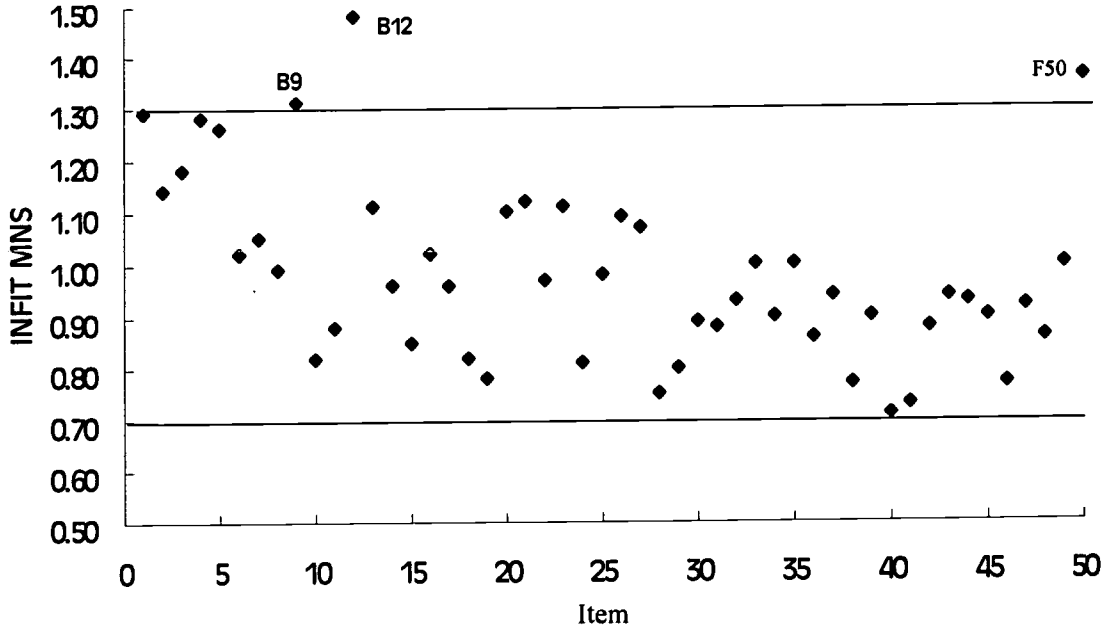


Figure 1. Fit statistics for the importance scale

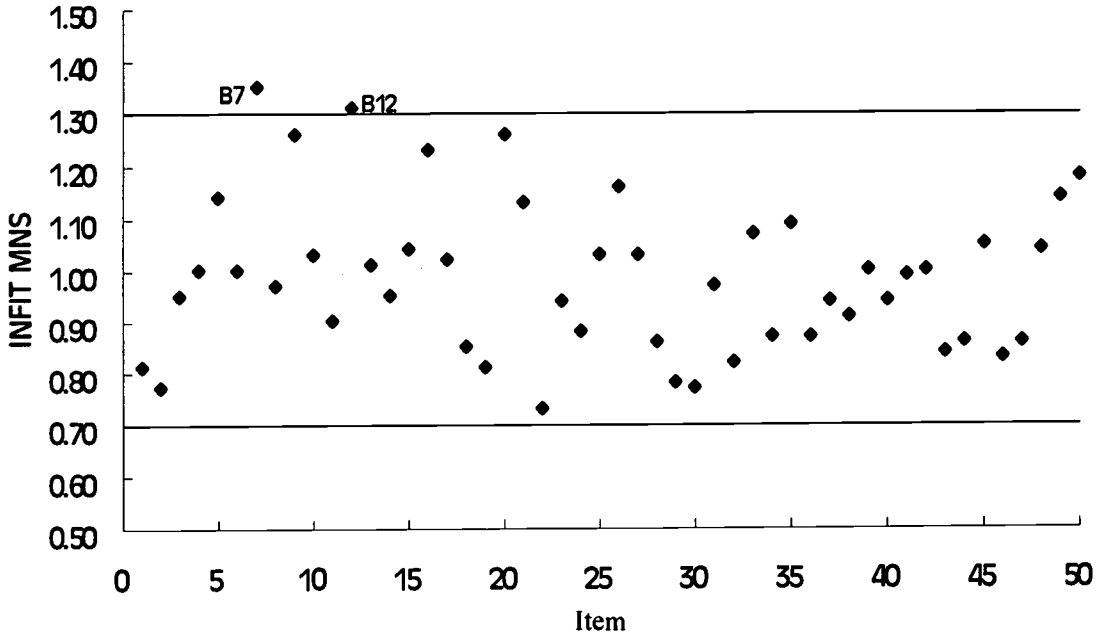


Figure 2. Fit statistics for the confidence scale

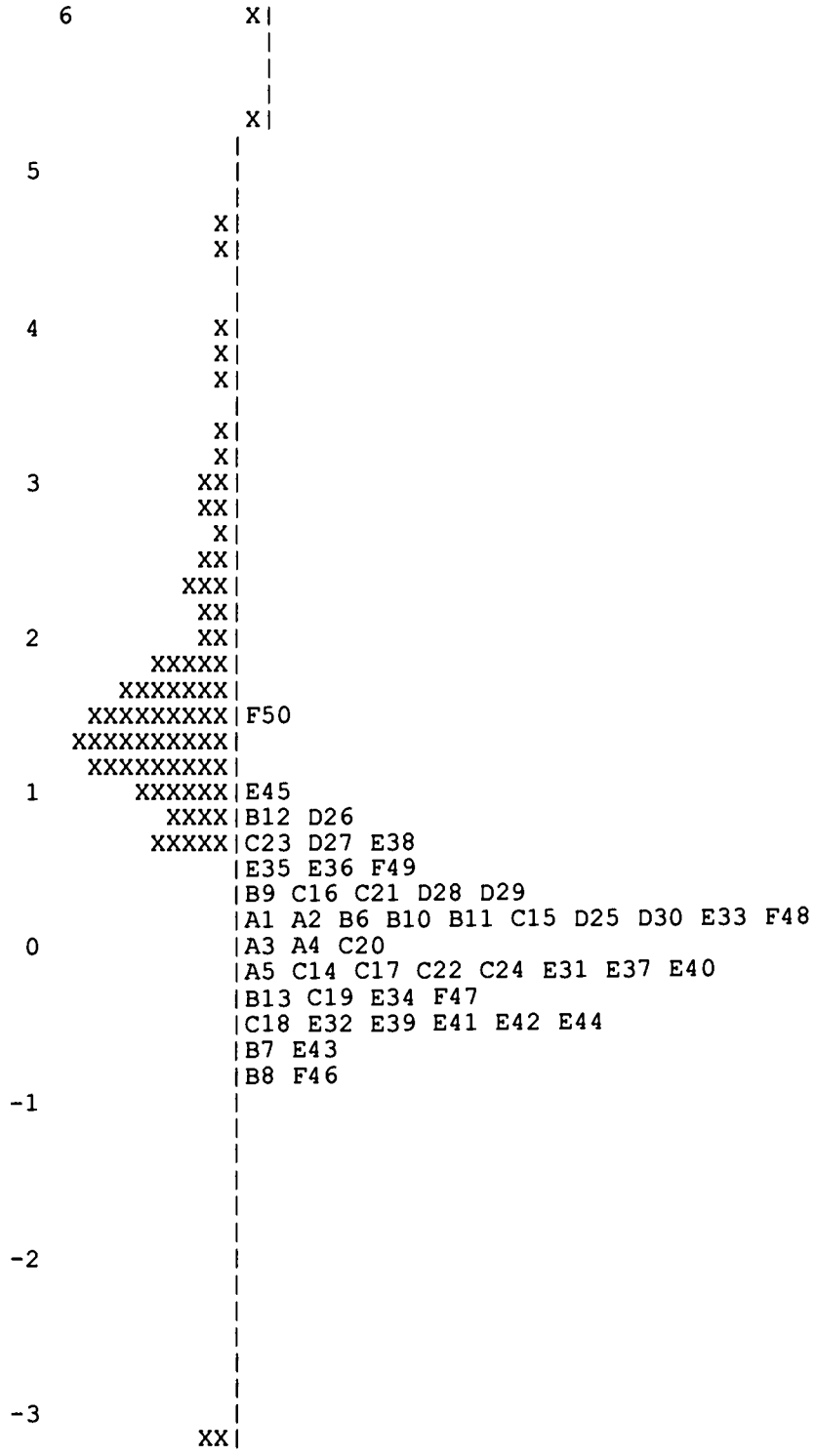
Calibration

Consider the importance scale. The left panel of Table 2 shows the overall difficulties, the 1st and the 2nd threshold difficulties, and their standard errors. Figure 3 shows the locations of persons and items on the linear continuum of ability/overall difficulty of the importance scale. The teachers locate relatively higher than the items, which means that most of the teachers consider these tasks important. This is expected because these tasks were screened through literature review and the pretests. According to the overall item difficulties, six out of the most important ten tasks (those with the smallest overall difficulties) belong to Dimension E (guidance and counseling). The least important task is: *F50: Supervise or instruct student on- or off- campus competition.* In sum, these 50 tasks are very important for beginning teachers, especially those tasks regarding guidance and counseling.

Table 2. Parameter estimates and their standard errors of the importance and the confidence scales

Item	Importance Overall	SE	1st	SE	2nd	SE	Confidence Overall	SE	1st	SE	2nd	SE
A1	.08	.16	-1.47	.35	-.47	.25	-.22	.25	-1.56	.57	-1.93	.37
A2	.06	.16	-1.04	.38	-.98	.28	-.48	.34	-2.38	.72	-1.35	.41
A3	-.07	.16	-.99	.38	-.90	.29	.02	.16			-2.30	.17
A4	-.08	.14	-.38	.37	-1.05	.30	-.89	.35	-1.36	.78	-1.68	.49
A5	-.17	.20	-1.79	.43	-.25	.28	-.61	.33	-2.62	.68	-.25	.38
B6	.18	.14			-1.14	.16	-.48	.34	-3.02	.69	-.41	.38
B7	-.78	.35	-1.99	.73	-.20	.43	.10	.15	-1.72	.33	-.72	.22
B8	-.84	.35	-1.72	.74	-.33	.44	.16	.13			-1.66	.14
B9	.33	.14	-1.65	.28	-.13	.21	.39	.15	-2.47	.31	-.41	.19
B10	.08	.18	-1.76	.38	-.51	.26	.49	.18	-3.12	.36	-.21	.21
B11	.06	.18	-1.42	.40	-1.03	.28	.99	.15	-3.17	.28	-.37	.18
B12	.85	.11	-1.48	.21	-.23	.18	.53	.15	-2.47	.31	-.71	.20
B13	-.37	.21	-1.10	.47	-.67	.33	.46	.18	-2.79	.36	-.54	.22
C14	-.25	.20	-1.46	.45	-.53	.30	-.13	.21	-2.09	.44	-.87	.27
C15	.11	.18	-1.91	.38	-.48	.25	-.20	.21	-2.15	.43	-.61	.26
C16	.27	.16	-2.01	.34	-.31	.23	.02	.20	-2.88	.41	.09	.24
C17	-.19	.20	-1.58	.44	-.54	.29	-.02	.18	-1.86	.39	-.94	.25
C18	-.47	.25	-1.18	.56	-1.01	.38	.34	.13			-1.93	.14
C19	-.34	.25	-1.92	.52	-.41	.32	.77	.11			-1.83	.12
C20	-.04	.20	-2.31	.42	.19	.26	.21	.15	-2.09	.32	-.48	.20
C21	.32	.16	-2.39	.33	.27	.22	-.65	.34	-2.60	.70	-.57	.39
C22	-.29	.24	-2.14	.51	-.11	.31	-.08	.25	-2.69	.51	-.81	.30
C23	.68	.13	-2.01	.25	-.10	.19	-.22	.25	-2.50	.51	-.73	.30
C24	-.18	.24	-2.38	.51	-.15	.30	-.27	.25	-2.48	.51	-.63	.30
D25	.05	.18	-1.88	.38	-.34	.25	-.16	.18	-1.70	.39	-.87	.26
D26	.79	.13	-2.17	.25	-.16	.18	.15	.15	-1.70	.33	-.98	.22
D27	.67	.15	-2.45	.29	.07	.20	-.17	.21	-1.95	.44	-.88	.27
D28	.35	.15	-1.72	.32	-.65	.23	.25	.17	-2.07	.35	-.93	.22
D29	.32	.18	-2.44	.37	-.20	.23	-.06	.21	-1.87	.45	-1.30	.29
D30	.07	.20	-2.30	.42	-.19	.26	-.29	.33	-3.30	.67	-.35	.36
E31	-.24	.24	-2.10	.51	-.38	.31	.44	.14	-2.17	.29	-.72	.19
E32	-.53	.34	-2.61	.70	.08	.39	.27	.15	-1.82	.33	-1.09	.22
E33	.19	.16	-1.89	.34	-.11	.23	.28	.14	-1.63	.29	-.92	.20
E34	-.42	.24	-1.83	.52	-.22	.32	-.46	.25	-1.84	.53	-1.03	.33
E35	.44	.18	-2.69	.36	.10	.23	.74	.14	-2.89	.28	-.24	.18
E36	.39	.13			-1.26	.15	-.03	.20	-2.41	.42	-.60	.25
E37	-.21	.24	-2.37	.50	-.01	.30	.20	.17	-1.90	.35	-1.10	.23
E38	.65	.12			-1.32	.14	.30	.14	-1.84	.30	-.87	.21
E39	-.56	.34	-2.55	.70	.05	.39	-.16	.18	-1.77	.39	-.75	.25
E40	-.27	.18			-1.47	.20	-.58	.25	-1.91	.52	-.56	.31
E41	-.62	.34	-2.12	.72	-.32	.42	-.16	.20	-2.39	.42	-.27	.25
E42	-.54	.24	-1.13	.55	-.71	.37	.16	.15	-1.76	.33	-.85	.22
E43	-.68	.25	-.56	.60	-1.11	.44	-.34	.24	-2.38	.51	-.48	.30
E44	-.49	.21	-.42	.52	-1.20	.40	-.16	.20	-2.10	.43	-.69	.26
E45	.97	.11			-1.30	.13	-.05	.20	-2.44	.42	-.46	.25
F46	-.86	.35	-1.22	.77	-.91	.49	-.83	.34	-1.72	.73	-1.31	.45
F47	-.32	.25	-1.87	.52	-.44	.33	-.28	.21	-1.51	.46	-1.23	.30
F48	.07	.20	-2.06	.43	-.43	.27	-.02	.17	-1.44	.37	-1.08	.25
F49	.42	.13			-1.19	.15	-.11	.15	-1.04	.35	-1.11	.26
F50	1.46	*	-2.02	.18	.02	.16	.80	*	-2.25	.23	-.41	.16

Note: * indicates no standard errors are obtained because of model identification. The blank indicates no responses are in that category.



Each 'X' indicates 3.7 subjects

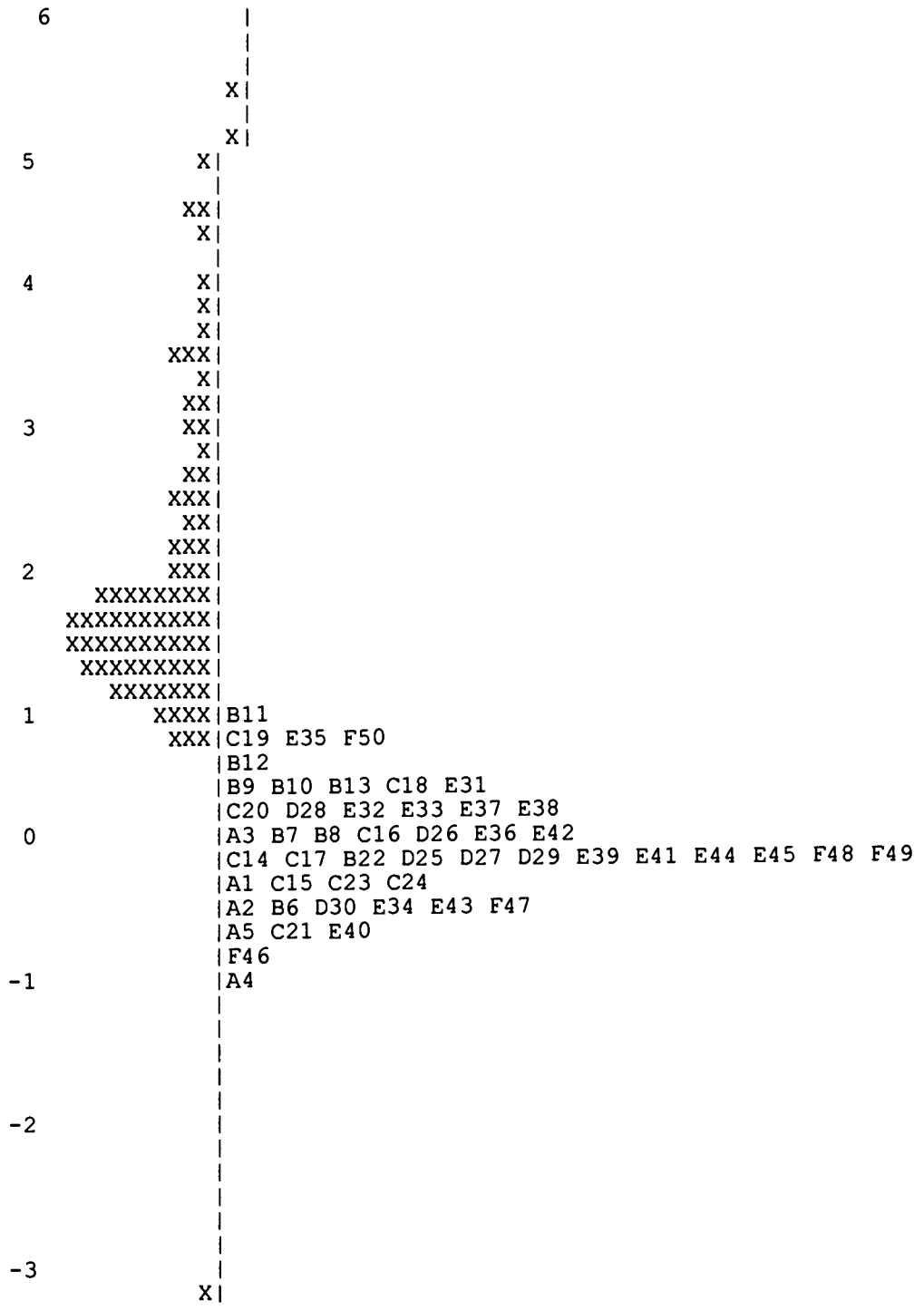
Figure 3. Location of persons and items on the linear continuum of ability/overall difficulty of the importance scale

Consider the confidence scale. The right panel of Table 2 shows the overall difficulties, threshold difficulties, and their standard errors of the 50 tasks. Figure 4 depicts the locations of persons and items on the linear continuum of ability/overall difficulty of the confidence scale. The students locate much higher than the items, meaning that most students are confident in doing these tasks, especially those in the dimension A (planning and preparing instruction). They are less confident in doing tasks in the dimension E (classroom management).

The estimated mean and variance of the college student population on the confidence scale are 1.90 and 1.69 logits, respectively. This population contains two sub-populations: Those taking education programs and those not. Their estimated means are 2.16 and 1.64 logits, respectively. The difference is significant at the .001 level, with an effect size of .40. According to Cohen's (1988) classification, this effect is moderate. Those taking education programs are more confident than those not. It may imply that the selection procedures or the curriculum of the education programs function fairly well.

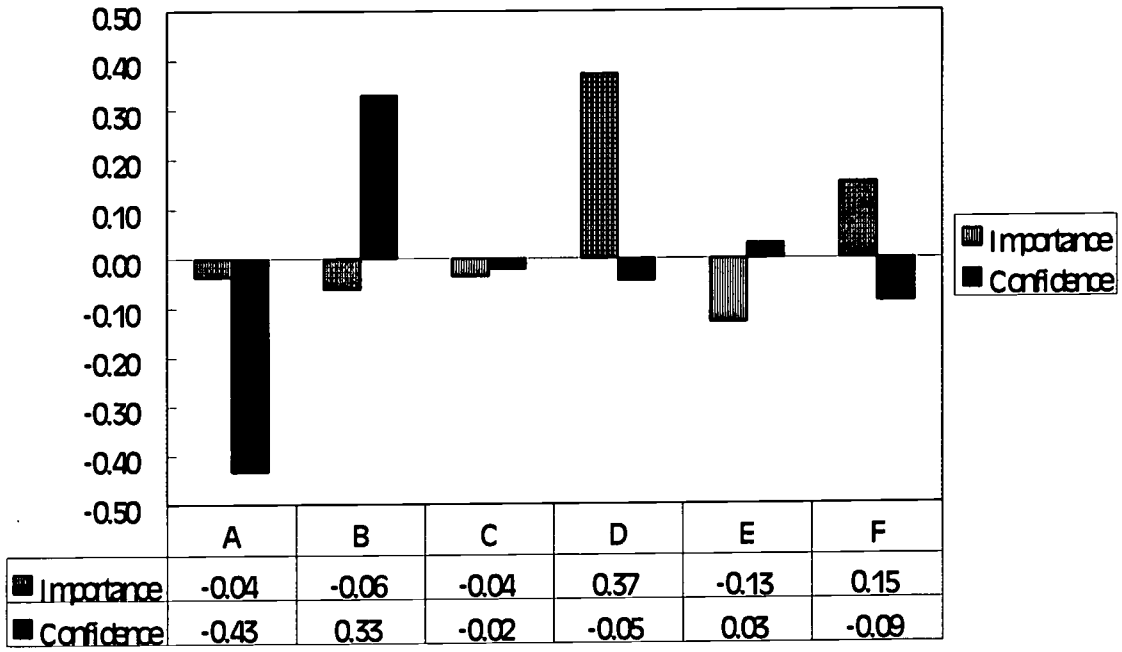
Importance versus Confidence

The overall difficulties of the importance scale were averaged across items within dimensions. These averaged overall difficulties represent the relative importance of the dimensions. As shown in Figure 5, Dimension E (guidance and counseling) is the most important and Dimension D (instructional assessment) is the least important for beginning teachers. Consider the degrees of the confidence scale. Dimension A (planning and preparing for instruction) is the easiest and Dimension B (classroom management) is the most difficult for college students, also shown in Figure 5.



Each 'X' indicates 6 subjects

Figure 4. Location of persons and items on the confidence scale



	A	B	C	D	E	F
Importance	-0.04	-0.06	-0.04	0.37	-0.13	0.15
Confidence	-0.43	0.33	-0.02	-0.05	0.03	-0.09

Figure 5. Averaged importance and confidence of the six dimensions

In terms of individual task comparisons, the overall difficulties of all the 50 items on the importance scale were plotted against those on the confidence scale, shown in Figure 6. They are moderately correlated (r = .26), indicating that the more important the task is, the more confident that the college students are on it. The nine tasks in the upper triangle are important but relatively difficult to achieve. They are:

B7: *Monitor student in-class behavior by physical proximity, eye contact, or moving about classroom to maintain order.*

B8: *Encourage, praise, or support desired student behavior*

B11: *Maintain order in the face of interruptions and unexpected events*

B13: *Handle students' emergent events*

C18: *Facilitate student learning with interactive teaching strategies*

C19: *Provide students opportunities to practice what they learn*

E31: *Exchange information, in person or by telephone, with students, parents, school staff, and relevant others to ensure proper behavior and development.*

E32: Establish, communicate, and show by example standards of social behavior to assist in the development of social skills of students.

E42: Establish proper sexual concepts

These nine tasks shed insight on revision of the curriculum of teacher education and pre- or in-service training of secondary schools.

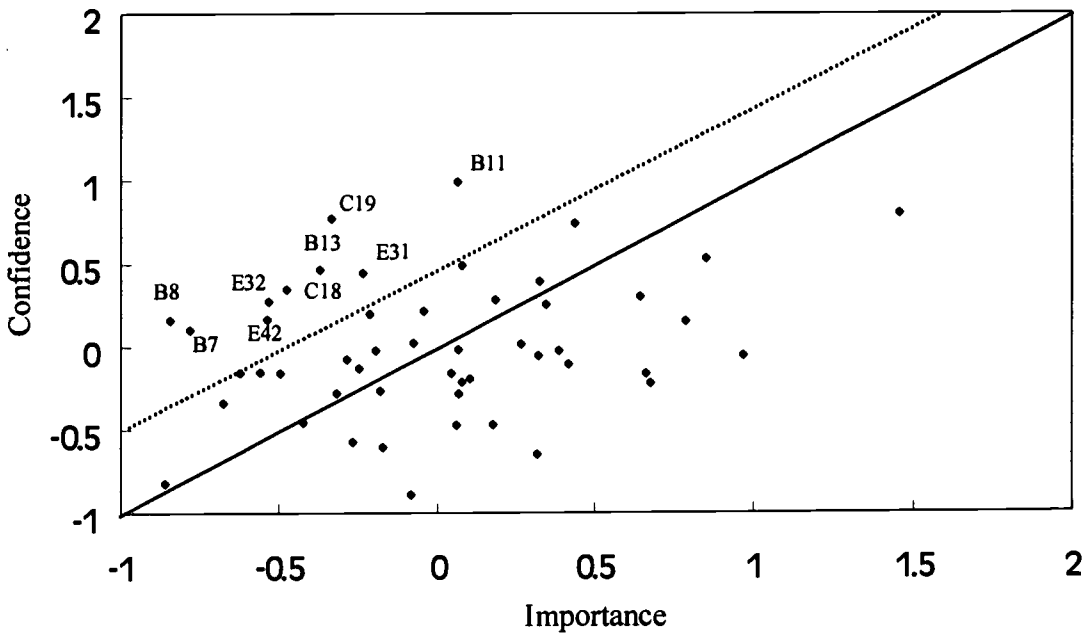


Figure 6. Relationship between importance and confidence of the 50 tasks

Conclusion

Fifty core tasks that are generally performed by and important for secondary school beginning teachers are identified. These fifty tasks cluster into six dimensions: (a) Planning and preparing for instruction, (b) classroom management, (c) implementing instruction, (d) instructional assessment, (e) guidance and counseling, and (f) additional professional activities. Two hundred and ninety-seven secondary school teachers were asked to judge the importance of each task. Four hundred and seventy-six college students were asked how confident they would be in doing these tasks if they were beginning teachers. Rasch technique was used. The data fit the partial credit model fairly well. Most of the teachers consider these

tasks important, especially those pertinent to "guidance and counseling." Likewise, most of the college students consider themselves very confident in doing these tasks, especially those pertinent to "planning and preparing for instruction." They feel less confident to the tasks pertinent to "classroom management." This corresponds to the Chinese old saying " To teach knowledge is easy; To teach person is hard." Nine tasks are identified as important but relatively difficult to achieve. Teacher education programs or secondary schools should make efforts to cultivate the corresponding skills and knowledge for doing these tasks.

The applications of the study are as follows. First, college students may acquire deeper understandings about what the secondary teachers usually do. These understandings can help themselves decide whether to apply teacher education programs or not. For instance, those who are neither capable nor willing to learn classroom management skills should not apply the programs. Second, those institutions that offer teacher education programs are able to develop evaluation procedures or instruments to select applicants with related aptitude and motivation of learning. They can also reconstruct curriculum to cultivate skills and knowledge for performing these tasks, especially for those nine important but relatively difficult tasks. Third, secondary schools may construct selection procedures or formulate strategies for personnel selection. Moreover, pre- or in- service training can be designed accordingly.

Although this study aims at the core tasks for secondary school teachers, the research paradigm can be applied to other school levels (e.g., kindergartens, elementary schools or colleges) and to other subject matters (e.g., language, mathematics, and social science, etc.).

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