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The QIBB quality initiative of the vocational training system in Austria

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SUMMARY

The QIBB quality initiative was specifically developed for the vocational training system in Austria. The quality system is distinctive in that it includes both objectives and survey instruments designed to address the specific concerns of vocational training. There are general quality concepts and instruments that are common to all schools and others that are differentiated according to the type of school. The various school types within the vocational training system use QIBB first of all to conduct system-related surveys, for example to test common quality objectives in connection with national priorities. QIBB also enables schools to conduct internal evaluations. Survey instruments and an automatic evaluation are available from an online database. The test power of the survey instruments made available in QIBB are also verified in empirical analyses. Initial studies indicate that the test power of almost all survey instruments examined is satisfactory.

Definition of school quality

If a group of people is asked what they understand by 'school quality', there will probably be as many answers as there are people. In fact, the question cannot be answered with reference to a single indicator and, depending on the approach, different indicators will be arrived

at, focusing, for instance, on outcomes such as performance or competences or on targets such as human resources and budget (see Böttcher, 2002; Fend, 2001; Kempfert and Rolff, 2005; *National Education Association,* 2008; Schratz, Iby Radnitzky, 2000). The European Commission defines the core aspects of school quality as follows: knowledge, success and transition (to further education), monitoring education and resources and structures (internal school resources and structures; SEQuALS, 2008).

Classification of indicators of school quality based on a multi-level model

Given the variety of indicators of school quality, a classification system needs to be used to categorise quality indicators. The multi-level model is such a system in that it sorts indicators according to different levels within the educational system (Fend, 2000, 2001):

- level of the school system: this level comprises indicators such as equal opportunities and supply density as well as humanitarianism (regulation of freedoms, participation and obligations) (Fend, 2001);
- school level: this is where indicators such as social climate and working atmosphere in school, satisfaction, student and parent participation or the quality of cooperation with the school environment (Fend, 2001; Holtappels, 2003) are to be found. These are indicators that concern the school system as a global system within which different people move and which is established in a social environment;
- class level: at this level indicators such as performance, learning and social behaviour, social relationships and interaction between students and teachers as well as parents and teachers are located, i.e. indicators that view the class as a learning community embedded in a social environment (Fend, 2001; Holtappels, 2003);
- personal level: this level comprises indicators relating to people. For teachers, this includes competences and attitudes; for students, it comprises attitude to study and work and competences (Fend, 2001; Holtappels, 2003).

Classification of indicators for school quality based on a process model

If educational and training processes are viewed as a chronological sequence in which it should be possible 'to turn schools, for all

students if possible, into productive spaces for learning and their long-term development' (Fend, 2000, p. 56), then indicators for school quality can be classified according to whether they relate to the framework conditions for the promotion of development processes, the actual teaching, learning and development processes or to training and education outcomes.

If school quality is related primarily to the outcomes of education and training processes, first of all quality indicators can be identified on the part of students or graduates. They include not only learning achievements, technical and interdisciplinary skills acquired, personal characteristics and attitudes, but also satisfaction with schooling and the atmosphere in the class or school. Secondly, outcomes can be identified on the part of the parents or the school's cooperation partners, such as parent satisfaction with training or the assessment of training outcomes by cooperation partners such as training firms.

At the process level, various indicators can be discerned relating to the design of organisational, teaching, learning and tuition processes. This category covers teacher-student interaction, support measures and, at school level, personnel development and employee promotion.

By contrast, conditional structures relate to the structural and procedural constraints under which a school – but also the various institutions within an educational system in general – organises its work. The conditional factors at school level include, for example, not only aspects such as formal performance standards, organisational framework and type of school but also external conditions (for example, the job market; Holtappels, 2003).

The vocational school system in Austria

In Austria, compulsory education begins at the age of six and lasts nine years. Secondary school education up to the school-leaving examination is called *Sekundarstufe II* in German-speaking countries. This educational segment is highly subdivided in Austria: the academic secondary school (*Gymnasium* in *Sekundarstufe II*) is distinct from the vocational school in terms of its curricular content and objectives. The vocational school system is divided into part-time vocational schools (*Berufsschulen*) for training as part of an apprenticeship, and vocational middle and upper schools. The training

corresponds with levels 3b to 5b of the international classification ISCED 97 (UNESCO, 2008), (http://portal.unesco.org).

The Austrian vocational middle and upper schools cover a range of subjects. The following school types are classified by specialisation:

• technical, trades and art colleges;
• business colleges;
• colleges for occupations in the social and services sector (specialising in fashion, tourism, social services and professions);
• colleges for agriculture and forestry;
• kindergarten training colleges and colleges for social pedagogy.

The vocational schools also participate in the quality initiative. Besides vocational training, they impart theoretical and general knowledge and complement company-based training (bm:ukk, 2008a).

In the school year 2003/04, 25.6 % of Austrian students in the tenth grade – i.e. directly after finishing compulsory education – attended vocational upper schools and 13.2 % attended vocational middle schools. 18.8 % attended academic secondary schools (*Gymnasium*) and 36.9 % part-time vocational schools.

QIBB quality initiative of the vocational school system in Austria

Launching the 'VET quality initiative – QIBB' (QIBB, 2008a) in 2004 was a significant step towards quality development and quality assurance in the Austrian school system. This joint initiative of all Austrian vocational schools marked the development and implementation of a quality system that comprises schools, the school supervisory board and the Federal Ministry for Education, Arts and Culture as the highest education authority, and perceives, defines and procedurally describes quality as a complete cycle – from guiding principles through to evaluation and modification measures.

The quality system of the part-time vocational schools
Quality manuals set out the organisation of the content as well as the features of the quality system (Paechter and Mayringer, 2006; QIBB, 2008a, 2008b). Key elements of these manuals are the mission statement, the quality matrix and guidelines on the content of the annual quality reports.

The mission statements express the common self-conception of the training institutions involved. This self-conception is marked, irrespective of the individual school type, by a close alignment on the demands of individual professions. In the quality matrix, the quality fields mentioned in the mission statements are broken down into sub-objectives. Each sub-objective is assigned (pedagogical, didactic and organisational) measures, outputs and indicators for the purposes of evaluation. A further feature of the quality system is that the quality work is conceived of as a continuous, objective-oriented and feedback-based improvement process (Federal Ministry for Education, Arts and Culture, 2008b). In line with this approach, the guidelines, quality objectives and sub-objectives, measures, desired outputs, indicators and evaluation methods and instruments form the framework of the quality work.

The quantity and wording of the quality fields, measures, outputs and indicators can vary according to school type. However, the quality matrices of all school types contain quality fields from four basic areas:

- teaching and learning: this area is divided into different quality objectives. They concern issues such as the quality of vocational training, general and personal development through school and support for students in a stimulating study and work environment;
- administration and quality management: the objectives in this area address employee advancement, quality development in relation to the performance of educational institutions and participation in quality development measures;
- economy and society: objectives in this area concern the innovative potential of training programmes and ensuring practical relevance through theoretical and practical training, the practical experience of teachers and cooperation with industry and other cooperation partners;
- internationality: this area concerns the international dimension of the training programmes and the opportunities to encourage mobility and intercultural understanding among the students.

With the exception of 'internationality', all the objectives formulated in the quality areas fall within the four categories defined by the European Commission as the core areas of school quality. The quality system employs a multi-level approach in so far as it specifies, for each objective (with output and indicators), the level within the school system where appropriate measures for quality development and assurance can be implemented (school authorities or the school itself).

Since the quality objectives are derived from and further differentiate the mission statements, there is always a broad spectrum of quality areas and a relatively large number of sub-objectives. For practical reasons, it is not feasible for all sub-objectives to be evaluated every year. Each year, therefore, a steering committee of school authority representatives and head teachers sets evaluation priorities as binding quality areas. Moreover, each school can work on other quality areas.

Evaluation

In the feedback-based quality system, objective-oriented, systematic, regular evaluation at all system levels is a prerequisite for quality development and assurance. This is based on the following guiding principles (see Holtappels, 2003):

- the evaluation meets the criteria of utility, feasibility, objectivity and correctness;
- it fulfils ethical principles;
- the evaluation is performed on both the processes and the outcomes of pedagogical and administrative action;
- feedback is collected from all groups capable of directly or indirectly evaluating the quality of the school;
- the survey instruments made available have the requisite test power.

The evaluation of part-time vocational schools in Austria exhibits characteristics of both external and internal evaluation. It is external in so far as evaluation instruments such as questionnaires are supplied to schools and then evaluated externally in an online environment. A further feature of external evaluation is that an evaluation is supposed to be made of selected quality objectives for all schools. An internal evaluation characteristic is that schools can define further evaluation areas for themselves, but must use the specified survey instruments. Another aspect that corresponds to internal evaluation is the fact that schools themselves prepare a quality report, that is to say they can interpret and comment on evaluation results (see Kempfert and Rolff, 2005). Also as regards the question of self-evaluation versus external evaluation, the present system uses a mix of methods. Teachers evaluating their own lessons is clearly self-evaluation. If, however, outsiders, such as representatives of industry, provide assessments, that corresponds to external evaluation (see Holtappels, 2003).

Although schools bear the lion's share of evaluation and are viewed as the key players in quality development, thinking about an

overall system is clearly to the fore. For evaluation, this means that it must be possible to compare and aggregate the results in parts. That is why schools are provided with a set of specially developed evaluation instruments and with electronic support for conducting and evaluating the surveys.

Survey instruments

To assist schools with their evaluations, survey instruments were developed that are tailored to the requirements of part-time vocational schools. They include the following types of instruments:

- questionnaires for students, graduates, teachers and parents;
- guidelines for discussions, e.g. with company representatives;
- survey forms for the school, e.g. for statistical surveys of the facilities and human resources.

Like a process model, the instruments target various quality indicators: processes (in the school, in the classroom) and behaviours (school management, teachers, administrative staff and students), outcomes/attitudes (students, teachers) and structural factors (facilities and human resources).

In terms of their specificity, three types of survey instrument can be identified: first, there are instruments that can be employed for all school types; second, there are instruments that are suitable for all school types in their basic form, but which contain some questions (e.g. regarding subjects) that are specifically formulated for each school type; finally, there are instruments that cover the specific structures, processes or results of a specific school type.

The survey instruments of the quality system are designed to ensure that statements or assessments in evaluations made by others never refer to an individual. Students do not assess an individual teacher but rather all their teachers as a whole (example of a questionnaire item: 'my teachers advise me how to improve my performance' – assess on a scale of (1) 'strongly agree' to (6) 'strongly disagree'). Thus, already at the survey stage, the data are not obtained to assess individuals. If possible, each aspect is assessed by a number of groups, e.g. by teachers and students. The survey instruments, which always cover the behaviour of a group of persons, are used to evaluate quality objectives within the context of a system evaluation. In addition, individual schools can also use the instruments for an internal evaluation.

QIBB also contains questionnaires which individuals can use to obtain feedback on their own professional behaviour. Such

Table 1. **Overview of topics covered by the survey instruments, ordered by processes and levels**

Assessor/Instruments	Structural factors	Process factors	Result factors
Students (questionnaires)	Environment/school: school-entry phase (lower classes) School: facilities	Class: course design (variety of methods, gender fairness, performance appraisal, practical relevance, etc.)	Persons: attitudes, competences Class: atmosphere School: atmosphere
Graduates (questionnaires)	----	----	Persons: attitudes, competences
Teachers (questionnaires)	School: facilities, resources, management of organisational and administrative processes	Persons: Course design School: personnel development, collaboration with colleagues	Persons: satisfaction
Parents (questionnaires)	Environment/school: school-entry phase (lower classes)	Class: interaction	School: atmosphere
School (survey forms)	School: facilities, resources, curricula, training courses, management of organisational and administrative processes	School: personnel development, resources, cooperation with external partners	Persons: certificates, final exams of students
External partners (businesses, etc.) (discussion guidelines)	School: curricula	----	Persons: competences of graduates

questionnaires are available for each level within the school system (teachers, head teachers, school inspectors, etc.). In this way, teachers can have their teaching assessed by the students.

To conduct and evaluate the surveys, schools are provided with an efficient technical infrastructure financed by the school authorities. All survey instruments are available as Web forms that can be processed and evaluated online.

Verification of the test power of the survey instruments using an illustrative sample

During the development of the QIBB survey instruments it was not possible to draw on existing instruments from other surveys or school experiments. There were a number of reasons for this: for example the

quality objectives are specifically tailored to part-time vocational schools. By contrast, initiatives in other countries often view school quality from a global perspective that considers only quality elements common to all school types and school levels (for Germany see: Basel and Rützel, 2005; *Netzwerke innovativer Schulen und Schulsysteme, 2008*; Zöller, 2005; for Switzerland: *QuiSS, 2008*; for the United Kingdom: *HMIe, 2008*). Such a system would not do justice to the distinctive features of the vocational training system. Furthermore, since there were no models from the vocational training system, not only the quality system itself but also the survey instruments had to be developed from scratch.

This means that the test power of the new instruments had to be verified in an empirical study. Thus when the evaluation was first conducted in the 2005/06 school year, the test power of 12 questionnaires on different fields (e.g. transparency of performance appraisal, gender-neutral teaching, administrative processes, and personnel development) was verified. The following questions were germane to the appraisal of the test power of the questionnaires:

- do the questionnaires or the questions in the individual questionnaires differentiate between varying types of quality?
- is test power of the questionnaires adequate? This question concerns, for instance, whether the items within a questionnaire show inherently valid structures in an empirical test;
- how strongly do evaluations of identical aspects vary from group to group (e.g. teachers and students)?

In the following, the verification of the test power of the instrument 'transparency of performance appraisal' will be presented by way of example. For this quality objective, one questionnaire was designed for students and one for teachers, although the teachers' questionnaire was not used in every type of school. The analysis draws on data for three school types from the 2005/06 school year, the first year of the evaluation. These types comprise schools and colleges for occupations in the social and service sector, colleges of business administration and business schools, and colleges for engineering, arts and crafts. The other school types began the evaluation a year later.

Review of the test power of the students' questionnaire on 'Transparency of performance appraisal'
In the 2005/06 school year, 70 355 students participated in the online survey, of whom 36 217 attended secondary schools and colleges for occupations in the social and services sector [*humanberufliche Schulen*] (1 737 classes, 51.48 % of participants) and 34 138

attended colleges for engineering, arts and crafts (1 800 classes, 48.52 % of the participants).

Table 2 lists mean values, standard deviation and the number of cases for each item of the questionnaire.

Table 2 shows standard deviations of the items with values between 1.18 and 1.45. The rather high standard deviations indicate that the students' assessments span the entire scale. This is desirable because the items in the later evaluation are intended to differentiate between various characteristics (e.g. in teaching behaviour) and facilitate comparisons between various groups and classes within a school.

The first step in examining the test power of the questionnaire

Table 2. **Mean values, standard deviation and number of cases for each item of the questionnaire 'Transparency of performance appraisal (students)'**

No	Item	M	SD	N	N/A
1	At the start of the school year, the teachers explain to us the knowledge and skills we are supposed to acquire by the end of the year.	2.92	1.36	70 343	12
2	The teachers discuss with us why we require those particular teaching materials.	3.73	1.43	70 335	20
3	The teachers make us aware of interconnections with other areas of life and learning.	3.04	1.29	70 334	21
4	My class teachers tell us how marks are determined (e.g. weighting of questions) in individual appraisals (e.g. schoolwork, test, oral examination).	2.43	1.34	70 331	24
5	My class teachers tell us at the start of the school year how the overall mark is determined for each subject (e.g. weighting of individual performance, importance of class participation).	2.30	1.29	70 331	24
6	My class teachers provide timely information on examination dates and submission deadlines (e.g. for schoolwork, tests, project work, homework).	2.05	1.18	70 329	26
7	My teachers update me on my current performance level if I ask them to.	2.40	1.36	70 325	30
8	The marks I am given reflect my actual performance.	2.64	1.28	70 315	40
9	My teachers advise me how I can improve my performance.	3.07	1.45	70 292	63
10	The teachers separate advice and feedback from the performance review.	2.98	1.30	70 082	273

M=mean value; SD=standard deviation; N=sample size; N/A=number of missing values; all items were answered on a scale of 1 (strongly agree) to 6 (strongly disagree).

was to investigate whether the individual items were answered in a differentiated manner. To do this, the so-called 'item popularity' was ascertained across the sample of all students (Bühner, 2004). This measurement shows if a question is answered with a desired variance or if all answers cluster around a similar point on the scale so that no differentiation can be made between different qualities. An item popularity of between 0.2 and 0.8 is desirable. In fact, examination of the ten items revealed satisfactory item popularity for all items.

The second step was to analyse relationships between items. To this end, a factor analysis was conducted on all items. During the development of tests and questionnaires, factor analyses are computed to check relationships between items and the dimensionality of a survey instrument. Thus, an extensive number of items can be broken down into homogeneous subcategories and analysed to determine if a number of items include a common latent variable (Bühner, 2004). Since the questionnaires described here were not developed on the basis of an existing and verified theoretical model, an exploratory factor analysis was computed (Bühner, 2004). It seeks to aggregate the items into groups on the basis of the correlations empirically found to exist between them. Table 3 shows the statistical values of the factor analysis.

Two factors were extracted in the factor analysis: items 1, 2 and 3 point to high loads on a common factor (between 0.67 and 0.80; see evaluation of factor loadings in Bortz, 1999). All three items concern whether teachers explain the usefulness of teaching material in real life and the marking system (which is why the factor is called 'teaching material'). All other items (4 to 9) load heavily on a second factor with weights ranging from 0.56 and 0.69. This group of items focuses directly on performance appraisal ('performance appraisal' factor). The joint explained variation of the two factors is 49.8 %. The factor analysis thus shows a very clear structure with two factors that can also be explained by the content of the items. The data of all school types were combined for the factor analysis. A more comprehensive review was carried out to investigate whether the same factor structures are found in the different school types. It was possible to confirm that they are (Paechter and Lunger, 2007a).

Verification of the test power of the questionnaire for teachers on 'Transparency of performance appraisal'
As regards teaching staff, a total of 3 618 teachers took part in the survey; 3 034 from the engineering and industrial colleges (83.9 %), 319

Table 3. **Factor loadings of the questionnaire 'Transparency of the performance appraisal (students)'**

No	Item	Load on factor	
		1	2
1	At the start of the school year, the teachers explain to us the knowledge and skills we are supposed to acquire by the end of the year.	0.16	**0.75**
2	The teachers discuss with us why we require those particular teaching materials.	0.16	**0.80**
3	The teachers make us aware of interconnections with other areas of life and learning.	0.23	**0.67**
4	My class teachers tell us how marks are determined (e.g. weighting of questions) in individual appraisals (e.g. schoolwork, test, oral examination).	**0.60**	0.30
5	My class teachers tell us at the start of the school year how the overall mark is determined for each subject (e.g. weighting of individual performance, importance of class participation).	**0.56**	0.32
6	My class teachers provide timely information on examination dates and submission deadlines (e.g. for schoolwork, tests, project work, homework).	**0.69**	0.05
7	My teachers update me on my current performance level if I ask them to.	**0.68**	0.08
8	The marks I am given reflect my actual performance.	**0.68**	0.16
9	My teachers advise me how I can improve my performance.	**0.58**	0.38
10	The teachers separate advice and feedback from the performance review.	**0.57**	0.36

from secondary schools and colleges for occupations in the social and services sector (8.8 %) and 265 from business schools (7.3 %).

Apart from numbers 8 and 10, the items in the questionnaire for students and teachers have parallel formulations (from the perspective of the student or teacher respectively).

Table 3 shows that, compared to the sample of students, the teachers' self-assessments (as expected) are far more positive (mean values between 1.24 und 2.37). The standard deviation of the items is also considerably lower. Moreover, the item popularities were lower than those of the correspondingly worded items for students.

Tests were also conducted to see how the various questionnaire items relate to one another and an exploratory factor analysis on all items was computed.

The factor analysis shows two groups of items that match the structure of the questionnaire for students. As in the students' questionnaire, items 1, 2 and 3 are grouped into one factor ('teaching materials'). All items have a high factor loading (between 0.56 and 0.80). Items 4, 5, 6, 7, 8, 9 can be grouped together into another factor ('appraisal

transparency'). They have a medium to high factor loading of 0.47 to 0.68. Item 10 comprises a factor on it own. No – loads on both factors – does not have a simple structure – cannot be interpreted. In terms of content, it cannot be assigned to the other items. However, it was left in the questionnaire for future use because it reflects an important aspect of the professional behaviour of a teacher.

Table 4. **Mean values, standard deviation and case numbers for each item of the questionnaire 'Transparency of the performance appraisal (teachers)'**

No	Item	M	SD	N	N/A
1	At the start of the school year, I explain to my students which knowledge and skills they are supposed to acquire by the end of the school year.	1.70	0.92	3 615	3
2	I discuss with my students why they require those particular teaching materials.	1.67	0.85	3 615	3
3	I make my students aware of interconnections with other areas of life and learning.	1.59	0.77	3 615	3
4	I tell my students how the marks are determined (e.g. weighting of questions) in individual appraisals, (e.g. schoolwork, test, oral examination).	1.42	0.75	3 615	3
5	I tell my students at the start of the school year how the overall mark is determined for each subject (e.g. weighting of individual performance, importance of class participation).	1.39	0.73	3 615	3
6	I provide my students with timely information on examination dates and submission deadlines (e.g. for schoolwork, tests, project work, homework).	1.24	0.63	3 615	3
7	I update my students on their current performance level if they ask me to.	1.30	0.63	3 614	4
8	I use the information and early warning system consistently and in good time.	1.64	0.96	3 612	6
9	I advise my students how they can improve their performance.	1.63	0.84	3 603	15
10	I stay abreast of the legal provisions governing performance appraisal.	2.37	1.31	3 579	39

M=mean value; SD=standard deviation; N=sample size; N/A=number of missing values; all items were answered on a scale of 1 (strongly agree) to 6 (strongly disagree).

The factor structure for the teachers' questionnaire is on the whole very clear and intrinsically consistent. Nevertheless, this survey instrument should be viewed with caution. The mean values and the low standard deviations of the items show that the teachers exercise little self-criticism in assessing their own behaviour, and their

judgement is on the whole uniform. Used alone, this questionnaire does not lend itself to assessing the quality of teaching. It should instead be used in conjunction with the students' questionnaire as a complementary instrument.

Comparison of the item mean values for students and teachers
A comparison of the item mean values in the questionnaire for students and teachers can shed light on the extent to which the assessments are similar. It is to be expected that the students' assessments will be 'stricter' since they represent an assessment of other people, whereas the teachers are judging their own behaviour. It would be preferable, for each item, for the assessments to run in parallel as far as possible. Figure 1 shows, for the items with a parallel formulation, the mean values of the assessments of both students and teachers.

As expected, the teachers' assessments are lower than those of the students. As an assessment of their own actions, they are more positive than the external assessment of the students. Apart from

Table 5. **Factor loadings of the questionnaire 'Transparency of the performance appraisal (teachers)'**

No	Item	Load on factor	
		1	2
1	At the start of the school year, I explain to my students which knowledge and skills they are supposed to acquire by the end of the school year.	0.19	**0.70**
2	I discuss with my students why they require those particular teaching materials.	0.05	**0.83**
3	I make my students aware of interconnections with other areas of life and learning.	0.12	**0.65**
4	I tell my students how the marks are determined (e.g. weighting of questions) in individual appraisals, (e.g. schoolwork, test, oral examination).	**0.68**	0.13
5	I tell my students at the start of the school year how the overall mark is determined for each subject (e.g. weighting of individual performance, importance of class participation).	**0.61**	0.22
6	I provide my students with timely information on examination dates and submission deadlines (e.g. for schoolwork, tests, project work, homework).	**0.68**	0.00
7	I update my students on their current performance level if they ask me to.	**0.53**	0.17
8	I use the information and early warning system consistently and in good time.	**0.64**	0.12
9	I advise my students how they can improve their performance.	**0.47**	0.43
10	I stay abreast of the legal provisions governing performance appraisal.	0.40	0.40

item 2, however, all items for both the teachers and the students are positive (scale range of 1 to mid-scale 3.5). The assessments of students and teachers largely run in parallel.

Conclusion of the verification of the test power of the survey instruments

The statistical analyses outlined above were carried out for 12 survey instruments in order to verify the test power of the questionnaires. On the whole, the analyses show that the test power of almost all instruments is satisfactory. In the case of only one instrument, it was clear that it could be shortened by eliminating a number of similarly formulated items (Paechter and Lunger, 2007a, 2007b).

Figure 1. **Assessments by students and teachers (mean values by item)**
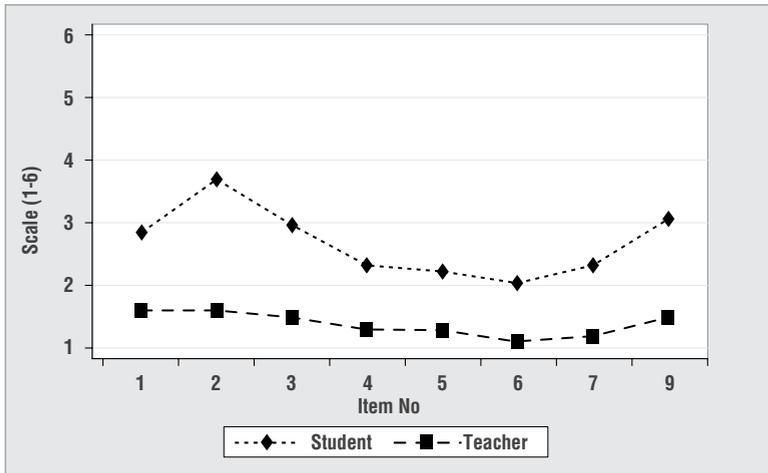
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