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## **ACADEMIC ENVIRONMENT AND LEARNING STRATEGIES: CONCEPTS AND CONTESTATIONS**

Interview based research into student learning revealed that higher education students adopt different strategies to learn. The results of the studies show that the students' learning strategies are influenced by the characteristics of the academic environment. The results of the interview based research led to the development of quantitative measures of the academic environment and the learning strategies. This study has thrown light (by reviewing the research literature) on development and evolution of the quantitative measures of both academic environment and the learning strategies adopted by the higher education students. The results of the initial quantitative research showed lower level of validity and the reliability of the measuring instruments. However, as a result of consistent efforts by the researchers, validity and the reliability of the instruments improved with the passage of time. The Course Experience Questionnaire (CEQ; Wilson et al. 1997) and the Approaches to Studying Inventory (ASI; Ramsden and Entwistle, 1981) and their variants are the most widely used instruments in this regard. This paper reports performance of these instruments in different educational contexts. These instruments performed better when they were pilot tested in each new context before using them for gathering the data. After the pilot tests, minor changes in the wording of the items make them suitable for use in the new educational setting.

## **Introduction**

There is a little research on student learning in Pakistan. We cannot improve quality of the education without exploring what helps or hinders learning in Pakistani educational context. It is also very important for the measures of academic environment (curriculum, teaching, assessment, feedback, workload and interaction among students and between teachers and students) and of learning strategies to be valid and reliable to explore the students' learning experiences. Therefore, this study explores validity and reliability of the instruments in different educational settings. The use of invalid and unreliable instruments may lead to incorrect results.

## **Method**

The review of literature involves context of the study, performance of the instruments used in the study, intended constituent structure of the instruments and their validation, construct validity (analyzed in factor analysis), criterion validity (analyzed by the correlation coefficient between the students' perceptions of the academic environment and their learning strategies). Discriminant validity is reflected by the difference among different groups of students with regard to the variables in the study. Association between the students' perceptions of the academic environment and their learning strategies is an evidence of validity of the instruments if positive perceptions of different dimensions of the academic environment are associated with the desirable learning strategies, and negative perceptions with the undesirable learning strategies. Reliability of the instruments is measured by the coefficient alpha values.

## **Development and evolution of instruments measuring students' learning strategies**

Key concepts with regard to student learning originated in interview-based research, and were operationalized subsequently into inventories and questionnaires to collect quantitative data from a large number of subjects on the specific dimensions of learning in higher education (Richardson, 2004). Various inventories have been developed by different researchers to investigate students' approaches to learning. Approaches to Studying Inventory (ASI) is one of the most widely used instruments in higher education (Duff, 2004).

Entwistle, Hanley & Hounsell (1979) developed the ASI that was based on 15 sub-scales. It was administered to first-year undergraduate students in three universities. The factor analysis identified three major learning strategies such as meaning orientation, reproducing orientation and achievement orientation to learning which were similar to internalizing, utilizing and achieving study processes identified by Biggs (1979).

Later on, Ramsden and Entwistle (1981) developed the ASI which was based on its earlier version (Entwistle, Hanley & Hounsell 1979). It contained 64 items in 16 subscales. They used it to gather data from 2208 students in six disciplines and 66 departments in the British universities and polytechnics, to investigate the students' approaches to learning. Factor analysis of the students' responses largely confirmed the factor structure of the ASI, found by Entwistle, Hanley & Hounsell (1979). The students' approaches to study were associated with their

perceptions of the learning environment; however, the associations were weak.

Afterward, Entwistle and Tait (1990) modified the ASI (Ramsden and Entwistle, 1981) and combined it with items on methods of studying to collect data from the engineering students at two universities and the students at polytechnics in Scotland. The ASI was based on subscales relating to four orientations to study: meaning orientation, reproducing orientation, achieving orientation, and non-academic orientation. They also used items to explore the students' perceptions of the learning environment. Academic performance was measured by self reports of academic progress and grades. Factor analysis confirmed (to a great extent) the four factor structure of the original ASI (Entwistle and Ramsden, 1983; Ramsden and Entwistle, 1981). The students' approaches to study were associated with their perceptions of the learning environment, which is another evidence of validity of the instrument.

Richardson (1990) developed a version of the ASI that contained 32 items in eight subscales relating to the deep approach and the surface approach to learning, and administered it to two cohorts of the undergraduate students at two sessions, fifteen days apart. The instrument demonstrated a satisfactory level of test-retest reliability, validity and internal consistency. He argued that the shorter version could be more practical than the original ASI (Ramsden and Entwistle, 1981). In a study, Pimparyon, Roff, McAleer, Poonchai & Pemba (2000) used 32-item version ASI (Richardson, 1990) to investigate the nursing students' approaches to learning at a Thai Nursing school. The scales in both the deep approach and the surface approach showed satisfactory internal consistency. They concluded that the internal consistency of the subscales was

consistent with Richardson (1990). Moreover, the approaches to study were associated with perceptions about the learning environment which is also an evidence of the validity of the instrument.

The most recent version of the ASI is the 'Revised Approaches to Studying Inventory (RASI). Entwisle, Tait and McCune (2000) reported the development of the RASI and the Approaches and Study Skills Inventory for Students (ASSIST). It consisted of seven sections including a revised version of the ASI (Entwisle and Ramsden 1983) and a section on students' learning preferences. In this validation study, data were collected from 1284 first year students at six British universities, 466 first year students at a Scottish technology university and 219 students at a South African university. The factor structure of the RASI and two-factor structure of eight items relating to the students' learning preferences were confirmed in factor analysis. The RASI consists of 52 items underlying 13 subscales relating to deep, strategic and surface approaches to learning.

In a study, carried out by Duff (2003), the 30-item version of the RASI was used to explore MBA students' approaches' to learning, at a university in UK. This version of the ASI is based on three scales (deep, surface and strategic approach) and each scale consists of 10 items. The factor structure of the instrument was confirmed. The values of coefficient alpha of the three scales ranged from 0.76 to 0.84, showing satisfactory reliability of the scales. In another study, Duff (2004) used 44-item version of the RASI (Entwistle and Tait, 1995) to examine the approaches of business management students. Coefficient alpha values for the six scales of the RASI ranged from .54 to .81: deep approach (.80), surface approach (.78), strategic approach

(.81), academic self-confidence (.54), lack of direction (.79) and metacognitive awareness of studying (.62).

The validity and the reliability of the ASSIST was investigated in two studies (Byrne, Flood and Willis, 2002; Byrne, Flood and Willis, 2004). Byrne, Flood and Willis, 2002 administered the ASSIST to undergraduate accounting students to examine the relationship between the approaches to study and the learning outcomes. The three scales had satisfactory internal consistency. The coefficient alpha values were 0.79 for the instrumental approach, 0.88 for the deep approach and 0.89 for the strategic approach. Moreover, the approaches to study were associated with the learning outcomes. In the second study, Byrne, Flood & Willis (2004) used the ASSIST to explore the approaches to learning and the learning preferences of the students in business studies. All of the three scales (the deep approach, the strategic approach and the instrumental approach to learning) had satisfactory internal consistency. And the students' approaches to study were associated with their preferences.

Thang (2004) used a questionnaire comprising items from the RASI (Entwistle and Tait, 1994), and some items from the ASI (Entwistle and Ramsden, 1983) to investigate the approaches to study among distance learning and campus-based students at a public university in Malaysia. The deep and the surface approaches were identified, comparable to Entwistle and Ramsden (1983), in both the distance-learning and the campus-based students. It also identified a third approach, in the campus-based students (only) which was also similar (to some extent) to Entwistle and Ramsden's achieving approach to study.

### **Study Process Questionnaire (SPQ)**

Study Process Questionnaire is another widely used instrument to explore students' approaches to learning.

Biggs (1978a) developed the SPQ which had 80 items based on ten scales; these scales related to three types of learning processes, such as the surface approach, the deep approach and the organized approach to learning (Richardson, 2000, p. 65).

Subsequently, Biggs (1982) reduced the SPQ to 42 items based on six scales relating to three study processes (Richardson, 2000, p.69). The study process is a combination of motive and strategy. In order to create similarity with the ideas of the other researchers, Biggs (1987) renamed the three study processes as surface approach, deep approach and achieving approach to study (Richardson, 2000, p. 69).

The 42-item SPQ (Biggs, 1987) was used by Beckwith (1991) to study the relationship between the first-year students' approaches to learning and their performance in the assessment. The internal consistency of the six subscales of the SPQ varied from 0.43 to 0.72. He concluded that internal consistency of the instrument needed to be improved without disrupting the conceptual clarity of the instrument. The instrument was found to be the poor predictor of performance measured by multiple choice tests. However, he argued that the SPQ stimulated the students' thinking about their approaches to study that could be used to induce the desirable approaches to learning.

Biggs argued (cited by Richardson (2000, p. 75) that the SPQ could be modified to investigate students' approaches to learning in particular educational contexts. In a study, Eley (1992) modified both the School Experience Questionnaire (Ramsden, Martin and Bowden, 1989) and Biggs' (1987) Study Process Questionnaire to make them suitable for use with the students who were concurrently enrolled in two courses of a second year undergraduate programme. Each question in both the instruments required

two answers; one in relation to one course unit and the other in relation to the other course unit. The original School Experience Questionnaire consisted of 31 items in five scales and the SPQ consisted of 42 items relating to three approaches to study: deep, surface and achievement. The pattern of correlations between the scales of the two instruments suggested that the individual students' perceptions of the course units were associated with their approaches to study in those course units. Zhang and Watkins (2001) administered the SPQ to the American and the Chinese students of higher education, to analyze the relationship between approaches to study and cognitive development. All of the subscales and major scales in the SPQ showed satisfactory internal consistency in American sample. All the subscales except deep motive (0.45) and all the major scales of the SPQ showed satisfactory internal consistency in Chinese sample. The students' cognitive development was associated with their approaches to study.

Later on, Hall, Ramsay and Raven (2004) administered (twice) the SPQ (Biggs, 1987) to the first-year accounting students to measure their study approaches, before and after the changes in the tutorial programme. The students tended to use the deep approach more in response to the changes. The internal consistency of the scales (deep and surface approaches to study) varied from 0.75 to 0.83. The test-retest reliability was examined by the correlation coefficients between the SPQ scores in two trials. Correlations were 0.39 and 0.61 for the surface and the deep approaches, respectively. In a similar study, Wilson and Fowler (2005) used the SPQ with a group of students who were concurrently enrolled in two courses which had different curriculum designs (conventional and action learning). The study aimed at investigating the impact of learning environment on students' approaches to study. The SPQ was administered twice, before and after the semester.

The students in the action learning course were more likely than the students in the traditional course to use the deep learning strategies. The values of coefficient alpha of the scales varied from 0.55 to 0.76.

### **Measuring students' perceptions of the learning environment**

Researchers also developed inventories to know about students' perceptions of different dimensions the learning environment. Ramsden, (1979) developed the Course Perceptions Questionnaire (CPQ) and used it along with interviews to analyze the relationship between students' perceptions of academic context and their approaches to study, in six departments at a British university. The questionnaire items were mainly based on the concepts identified in preliminary interviews conducted with the students from two of the six departments involved in the study. Factor analyses of the students' responses to the CPQ identified eight dimensions along which the students evaluated the academic context: commitment to teaching, relations with students, workload, formal teaching methods, social climate, vocational relevance, clear goals and standards, and freedom in learning. The students in different departments differed in their perceptions of their learning environments. He found that the students' perceptions of the academic context were associated with their approaches to study.

Ramsden and Entwistle (1981) developed the CPQ which consisted of 40 items in eight scales. They administered it to the students of the British universities and polytechnics along with ASI to investigate the effects of students' perceptions of the academic departments on their approaches to study. The factor analysis of the CPQ scales identified two factors: factor 1 reflected the sub-

scales of formal teaching method, clear goals and standards and vocational relevance, and the second factor contained the sub-scales of good teaching, freedom in learning and openness to students (indicating positive perceptions of the courses). The workload did not have a salient loading on either factor but it reappeared in combined analysis of course perceptions and approaches to study. There were few associations between the students' scores on the two instruments.

Some researchers expressed the view that weak association of students' approaches to study with their perceptions of learning environment might be due to weaknesses in the instruments. As a result, Ramsden (1991) developed Course Experience Questionnaire (CEQ) based on the Course Perceptions Questionnaire (Ramsden and Entwistle, 1981; Entwistle and Ramsden, 1983) and on the questionnaire used by Entwistle and Tait (1990) to measure the students' learning experiences. It contained 30 items based on five scales. Respondents indicate level of their agreement with each statement on a 5-point likert scale from definitely agree to definitely disagree. The CEQ controlled for response bias because half of the items refer to positive aspects and the remaining half of the items to negative aspects, and are, therefore, scored in reverse. The scales involved good teaching, clear goals, appropriate workload, appropriate assessment and emphasis on independence. It was administered to final-year undergraduate students from 13 higher education institutions in Australia in its national trial. The students answered the items keeping in view the programme of study (that they were taking) instead of individual course units or individual teachers. Factor analyses confirmed the scale structure of the CEQ. All the scales had satisfactory level of internal consistency according to Cronbach's (1951) coefficient alpha. Criterion validity of the CEQ

scales was demonstrated by their associations with the quality of student learning, student satisfaction and teachers' reports of their own attitudes to teaching. Heavy workload and inappropriate assessment were associated with the surface approach; whereas, good teaching and clear goals were associated with the deep approach to study.

Wilson, Lizzio & Ramsden (1997) administered both the short version of the CEQ (CEQ23) and the long version of the CEQ (CEQ36) along with two scales (6 items each) representing surface approaches and deep approaches, to a multidisciplinary sample of students and graduates. The long version of the CEQ contained 30 items of CEQ (Ramsden, 1991) plus a Generic Skills scale that consists of six items relating to analytic skills, problem solving, teamwork, work planning and communication. Factor analysis confirmed the factor structure of the CEQ23 and CEQ30 along with the structure of Generic Skills scale. All the scales of both the instruments demonstrated satisfactory levels of internal consistency, according to Cronbach's (1951) coefficient alpha. Both the instruments showed satisfactory validity and reliability. The students' perceptions of the courses were associated with their approaches to study.

The results of a number of studies showed that both the versions of the CEQ (CEQ23 and CEQ36) performed better in different educational contexts. In a study, Byrne and Flood (2003) administered the 23-item CEQ to the undergraduate students (who were taking courses in accounting at Dublin City University), to investigate its validity and reliability. It is based on five scales. All the scales showed satisfactory internal consistency. It also demonstrated criterion validity as all the scales were positively correlated with the students' overall satisfaction with the course. Richardson (2009, p. 8) argues that the

CEQ can be regarded a global measure of perceived academic quality. To examine construct validity of the CEQ and the relationship between students' perceptions of learning environment and their approaches to study in higher educational context of Hong Kong, Webster et al. (2009,) administered the 17- item CEQ with fourteen items from the SPQ (Biggs, 1987) to undergraduate students from two discipline areas. Factor analysis confirmed the four scale structure of the 17-item CEQ. The students' approaches to study were associated with their perceptions of the learning environment. They concluded that the CEQ could be used to evaluate the higher educational courses in Hong Kong.

### **Perceptions of the learning environment and approaches to study**

Prosser and Trigwell (1990) argue that validity of the questionnaires that are used to evaluate the courses can be examined by examining the association between the students' perceptions of the courses and the students' approaches to learning in those courses; the students who use deep approach would be expected to evaluate their courses more favourably than the students who use the surface approach to study. Similarly, the courses that are evaluated more favourably would be expected to have more students who use the deep approaches than those who use the surface approaches to study. Ramsden and Entwistle (1981) carried out the first comprehensive quantitative study to investigate the relationship between students' perceptions of the learning environment and their approaches to study. They employed the Approaches to Studying Inventory (ASI; Entwistle, Hanley and Hounsell, 1979) and Course Perception Questionnaire (CPQ; Entwistle and Ramsden, 1983) to investigate the approaches to studying and perceptions of the learning

environment of the undergraduate students from six disciplines and 66 departments at British universities and polytechnics. The students' perceptions of their learning environments were associated with their approaches to study; however, there were fewer and weak associations between the perceptions and approaches. Subsequently, Parsons (1988) conducted a study with English speaking and Afrikaans-speaking undergraduate students in South Africa to replicate the findings of Ramsden and Entwistle (1981) and Entwistle and Ramsden (1983). The ASI and the 40-item CPQ were administered to the students. The deep and the surface orientations were identified in both the samples. He also found fewer associations between perceptions and approaches.

Prosser and Trigwell (1990) tested the validity of the students' ratings of their courses by analyzing its association with their approaches to study. They used a teaching and course evaluation questionnaire, and 12 items to measure approaches to study, which were derived from the ASI (Entwistle and Ramsden, 1983). They found that positive perceptions of the courses were associated with deep approaches to study.

The CEQ and different versions of the ASI have been used in various studies which investigated the relationship between students' perceptions of the learning environment and their approaches to study. Validity and reliability of these instruments have also been reported in these studies. In a study, Lizzio, Wilson and Simons (2002) administered the CEQ (Ramsden, 1991) and 12 items from the ASI (Entwistle, Hanley & Hounsell 1979) to a multidisciplinary sample of undergraduate students. The factor structure of the CEQ was confirmed. The deep and surface scales of the ASI also demonstrated satisfactory internal consistency. The students' perceptions of the courses were associated with their approaches to learning

(an evidence of criterion validity). Similarly, Kreber (2003) used the ASSIST (Entwistle, Tait and McCune, 2000) and the CEQ (Ramsden, 1991) to explore approaches to study and perceptions of the Canadian undergraduate students. The ASSIST consists of seven sections and this study used the fourth section (52-item approaches to studying inventory) of this inventory. To measure the students' perceptions of the learning environment, shorter version of the CEQ (23 items) was slightly modified to make the items suitable for the particular course. It consisted of 25 items including the item "overall, I am satisfied with the quality of the course". This version consists of five scales. The factor analysis produced the six factors (generic skills, clear goals and standards, good teaching a, good teaching b, heavy workload and facts oriented assessment) and confirmed its factor structure with the exception of the good teaching scale which split into two scales. The item "feedback on my work is usually given only in the form of marks or grades" loaded on a separate factor (good teaching a). The internal consistency of the six scales varied from 0.59 to 0.78. The three factor structure of the 52-item ASI was also confirmed by the factor analysis. The findings confirmed the association between perceptions and approaches.

Researchers modify the widely tested and verified instruments according to the educational settings. Sadlo and Richardson (2003) used the CEQ and 32-item version of the ASI to examine the effects of curriculum design on students' approaches to study. The scale structure of both the instruments was confirmed. They concluded that both the instruments could be used to investigate problem-based learning environment. They found associations between the students' scores on the two instruments (CEQ and ASI); the amount of overlap between the scores on the two instruments was over 50 percent. In a similar study

(Richardson, Gamburg & Hammerberg, 2005) the CEQ (Wilson, Lizzio & Ramsden, 1997) along with the RASI were used to examine the students' approaches and perceptions in seven occupational therapy schools in Denmark. The CEQ proved to be valid and reliable instrument in the new context; however, the RASI could not demonstrate satisfactory level of validity and reliability. In another study, Richardson, Dawson, Sadlo, Jenkins & Maccines (2007) administered the CEQ and the RASI to the medical students from two undergraduate and two master's programmes in an English university. The undergraduate programmes had subject-based curricula and the masters program had problem-based curricula. Factor analysis confirmed the intended constituent structure of the CEQ in the new context. All the six scales of the CEQ exhibited satisfactory internal consistency. The RASI proved to be less satisfactory; four of its subscales did not have satisfactory internal consistency, however, its three factor structure was confirmed. The overlap of students' scores on the two instruments was also impressive.

The questionnaires that are used in research need to be valid and reliable (Richardson, 2009). The validity and reliability of different instruments that are used to investigate students' perceptions of the academic context and their approaches to study have been demonstrated in various studies in different learning contexts. Many researchers made changes in these instruments to make them suitable for use in different contexts and situations. Lawless and Richardson (2002) modified 36-item version of CEQ and 32-item version of ASI to make them suitable for distance learning students. Particularly, references to lecturers or teaching staff were replaced with references to 'tutors' or 'course material'. The modified CEQ consisted of seven subscales: appropriate assessment, appropriate workload, clear goals, generic skills, good materials, good

tutoring and student choice. Factor analysis confirmed the constituent structure of the modified CEQ and of ASI in distant learning context. The CEQ also had satisfactory internal consistency. The students' perceptions of their courses were associated with their approaches to study. The CEQ also proved to be an appropriate instrument to evaluate individual courses.

To investigate students' perceptions and approaches in distance learning context, Richardson (2003) administered the 36-item CEQ and the RASI (Entwistle, Tait & McCune, 2000) to the students who were taking web-based course in computing by distance learning. He used the modified version of the CEQ (Lawless and Richardson, 2002); the RASI was also modified to make it suitable for use with the distance learning students. The modified version of the CEQ consists of seven scales. The factor analyses confirmed the intended constituent structures of the instruments. All of the CEQ scales and most of the RASI subscales had satisfactory internal consistency. The students' scores on the CEQ and the RASI shared 82.6% of variance. In another study, Richardson and Price (2003) further modified the 36-item CEQ and the 32-item ASI to refer to particular course and administered them to the students who were taking two electronically delivered courses in computer science. Intended constituent structure was confirmed; however, internal consistency of the ASI was not satisfactory. The CEQ showed a satisfactory validity and reliability. It replicated the results of the study by Sadlo and Richardson (2003). Richardsson (2005) administered the modified versions of 36-item CEQ (Lawless and Richardson, 2002) and 52-item RASI to the distance-learning students in seven courses. He further modified the CEQ to refer to particular course. The factor analyses confirmed the intended constituent structure of both the instruments. Both the instruments proved to be

valid and reliable in the distance learning context. The students' scores on the two instruments were associated; the amount of overlap between the scores on the two instruments was 61 percent.

In another study, Richardson (2006) used 36-item version of the CEQ (Lawless and Richardson, 2002) and the RASI with the distance learning students of technology to analyze the validity and reliability of the two instruments. The RASI was modified by Richardson (2005b) to use with the distance learning students. The study confirmed the results obtained by Richardson (2005b) with regard to validity and reliability of the CEQ. Factor structure of the RASI was confirmed; however, internal consistency of some of its subscales was less satisfactory. There was also an overlap between the students' scores on the two instruments.

Richardson (2009) combined the CEQ (consisted of seven subscales) with RASI (based on 13 subscales and three major scales) to survey the distance-learning students in business studies. The constituent structures of both the instruments were confirmed. Both the instruments demonstrated satisfactory validity and reliability. Richardson (2009) further confirmed the constituent structure and validity and the reliability of the CEQ (consisted of seven subscales) and the RASI by studying perceptions and approaches of distance learning students.

The results of the reviewed studies have shown that the CEQ and different versions of the ASI have been reasonably successful in measuring the students' perceptions of their learning environments and their approaches to study in different educational contexts; however, validity and the reliability of the instruments varied from study to study. Ramsden (1991) argues that the CEQ is a useful and reliable measure of academic quality of programmes of study in systems of higher education that

are based on British models. The CEQ was designed to measure the students' perceptions of a programme of study, not of individual teachers and course units within the programme.

Different forms of the ASI seemed to work differently in different educational contexts. The original version of the ASI, according to Richardson (2000, p.108) is a rather long instrument to complete. As a result of this consideration, short forms of the ASI have been developed by different researchers such as 32-item ASI, 30-item ASI and the 18-item ALSI. Richardson (2004, p. 350) argues that shorter instruments may be useful for practical purposes. Richardson (1992, 1993; cited by Richardson (2000, p. 112) administered the 18-item ASI to the two successive cohorts of campus-based students at two sessions. The three scales of the ASI exhibited satisfactory test-retest reliability and internal consistency. In another study, Newstead (1992; cited in Richardson, 2000, p.113) administered the 18-item ASI to the campus-based university students in UK. The three scales, in this study, exhibited moderate internal consistency. He recommended this version as a 'quick and easy' method to measure student learning. By following his suggestion, Ullah et al. (2011) used Approaches to Learning and Studying Inventory (ALSI) to measure the students' approaches to learning in two Pakistani universities. The study confirmed the intended constituent structure of the ALSI in the Pakistani higher educational context. However, CEQ36 performed slightly less satisfactorily.

## **Conclusion**

A number of instruments have been developed by the researchers to measure the learning environment and learning strategies. The ASI and its different variants are the most widely used measures of students' learning

strategies. Its validity and the reliability have been tested in different educational settings. It has exhibited reasonable level of validity and reliability in different contexts. The researchers all over the world adapt it to use in specific educational settings. The CEQ is also the most widely used and validated instrument. It has two most important versions: CEQ36 and the CEQ23. Both of these instruments demonstrated satisfactory validity and reliability in different educational contexts.

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