



Quality of University Computing Education: Perception of Pakistani Students

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Abstract

Quality in higher education is important in today's knowledge economy. Countries can improve their economies by fostering knowledge based exports. Developing countries have extensive youth force and quality education can transform them into an active resource for their countries. Computing is an important discipline and quality graduates in this domain can actively participate in increasing software exports. In this paper we investigated Pakistani students in computing discipline to understand the level of quality. The findings of the survey suggest overall quality of teaching in Pakistani higher education institutions is increasing, but there are some minor areas of concerns which should be improved. The findings of this paper help education planners in Pakistan to improve learning among students.

Keywords: Computing education, quality teaching, student evaluation.

Introduction

Higher education institutions play a vital role in bringing quality education at higher level. Governments chalk out quality plans and ensure its implementation by higher education institutions. Delivery of quality education is main objective of universities and as a result quality becomes a focal point for universities reputation¹. By applying consumer behaviour theory in education we can conclude that students have the right to obtain the best quality education². Understanding the needs of students is pre-requisite of improving quality and to understand those needs, it is important to understand the quality attributes embraced by students. People perceive quality differently. Some see it as quality in teaching, the calibre of students and the students' performances on job². John Richardson suggested that changes in the design and delivery of specific courses will affect how students tackle these courses³. Appropriate curriculum, pedagogical methods and suitable evaluation mechanism motivate learning process. There is a direct link between students' approaches to learning and their perceptions of the academic environment.

In case of Pakistan, Higher Education Commission (HEC) has been instrumental in providing quality guidance to educational institutions⁴. Due to potentially good job prospects computing education has been in good demand by students in Pakistan. Keeping this in view, institutions are providing education of computer science at undergraduate and graduate levels. University education is vital for students since it provides last opportunity for students to be prepared for future job market challenges. In Pakistan, computer industry has grown fast⁵, which led to extensive increase in demand of computer science and software engineering graduates. Finding suitable faculty is a challenging task in developing countries^{6, 7}. The aim of this

paper is to understand quality perception of bachelors and masters computing students about university education quality.

Remaining paper is structured as follows: Section 3 describes research methods and data collection procedures. Section 4 discusses results of the survey and is followed by a conclusion.

Methodology

The quantitative approach is followed in this project. The survey was conducted from undergraduate and graduate university students. A questionnaire was designed comprising of 28 questions. The questions were grouped into different categories to ease the judgement of responses. Questionnaires were floated in multiple institutions in Islamabad/Rawalpindi region, and 150 responses were received back. Data collection was carried out by authors during the month of December 2012. Out of 150 responses, 84 were undergraduate students and 66 were graduate students.

Results and Discussion

In the survey, it was observed that masters' students agree more regarding the teachers' capability of explaining concepts than bachelors' students. Figure 1 shows that 59% masters' students and 50% bachelors' students agree that teachers are good at explaining concepts. This figure does not show much of the difference but in case of strongly agree difference is quite large.

Teaching style plays a vital role when it comes to making the students understand something. The most observed and appreciated style of teaching around the world is participative. In the survey, students were asked about teaching style at their level. Masters students agree more to the fact that teaching style

is mostly participative however bachelors' students show more of a neutral attitude. Figure 2 shows the graph that compares bachelors and masters level. Once again there is a significant difference when it comes to strongly agreeing to the fact.

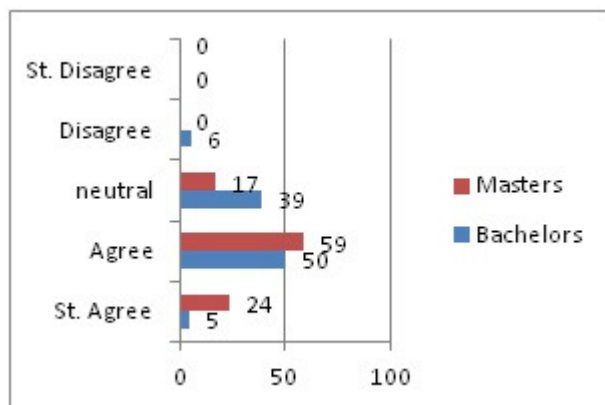


Figure-1
Teachers good at explaining concepts

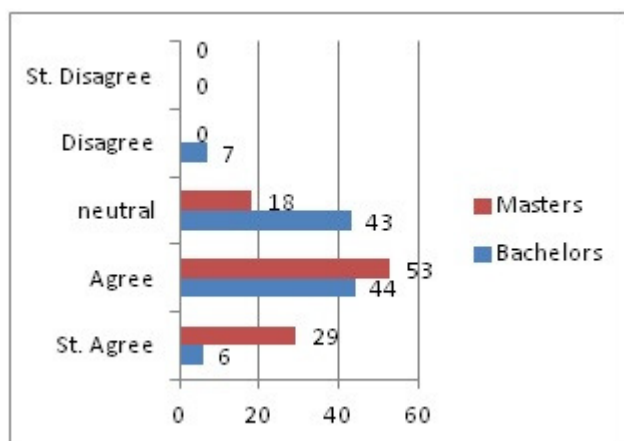


Figure-2
Teachers good at explaining concepts

Teacher enthusiasm has been outlined as a prominent teacher behaviour affecting students' learning⁸. Although enthusiasm is a difficult behaviour to judge but it is an important behaviour for teachers to exhibit. Enthusiasm affects student attitudes and learning⁹. Positive attitude of teachers towards learning encourages students to involve in learning process as well¹⁰.

In the survey when computing students were asked about their teachers' enthusiasm, 63% of bachelors students agree while 28 % show neutral attitude. 48% students of masters agree that their teachers are enthusiastic about their teaching while 36% remain neutral, which is 8% greater than bachelors' students.

Teachers' guidance can be a positive ingredient regarding students taking decisions about their career and professional life. Student-Teacher association is not just limited to academic concerns. A teacher can help or advise a student on non-

academic issues as well. Figure 4 shows that 51% bachelor students agree that they received sufficient advice from their teachers. However most of the masters' students i.e. 35% strongly agree to it.

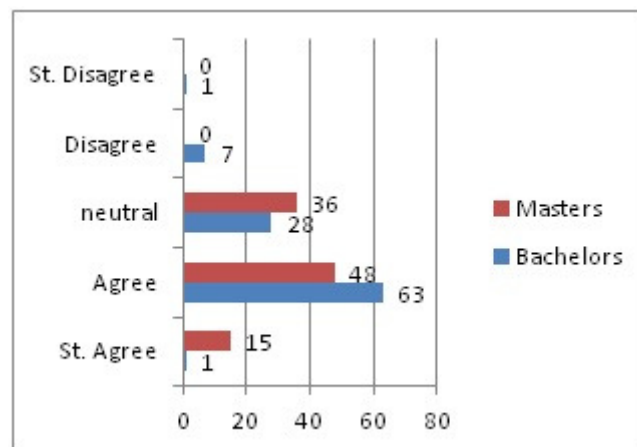


Figure-3
Teachers enthusiasm

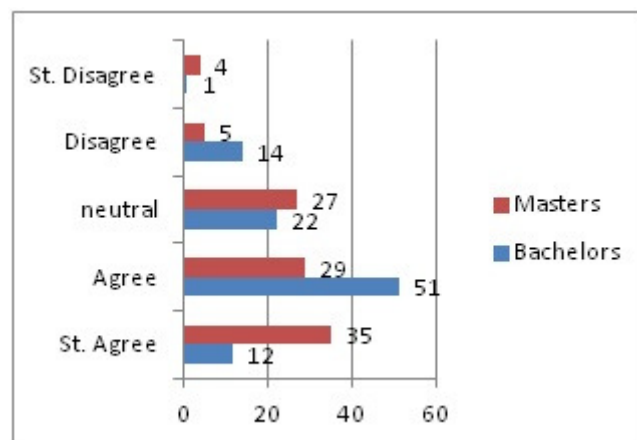


Figure-4
Teachers guidance

Teachers' availability has been a big issue in institutions. Well reputed universities have taken it seriously and made sure that faculty members come regularly. Importance of teacher's guidance is contingent to teacher's availability. In the survey it is found that both bachelors and masters level students agree with almost same ratio. In case of strongly agree the percentage of masters' students is almost twice as bachelors' level.

Course structure and formulation is an essential activity before the course is offered. Importance of course outline cannot be denied. Course outline not only forms a course plan but also gives guidance to students. Organization of courses is the responsibility of university department such as offering a cluster of courses that are inter-related or have impact on the degree. Course was another module that was hit in the survey. Multiple questions were asked from students of both levels. Clear distinction of perception of both levels is observed.

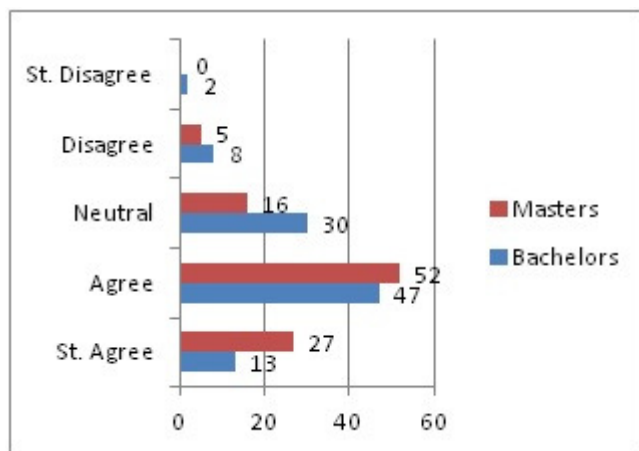


Figure-5
Teachers availability

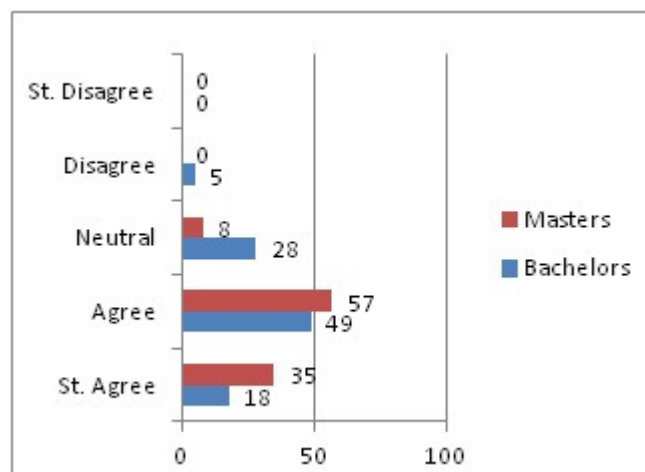


Figure-7
Adherence to course outline

Well formulated course outline makes it easier for teacher to conduct the whole course. It explicitly intimates the course work that is going to be covered in certain duration of study. It also helps in organizing the course topics in a weekly plan. It is the responsibility of the instructor to construct a course outline before the commencement of classes. In the survey students were asked whether they agree to course adequacy of their studies. As shown in figure 6, Masters' ratio is almost twice to bachelors in case of agreeing to question. While a big percentage remains neutral about it.

Graph in figure 8 is very much related to the paragraph discussing adequacy of course outline. This graph statistically describes the percentage of students who think that with such course outlines, they are getting the right skill development. In the survey, almost half of the students agree that they are getting the right skill development. In the case of strongly agree, bachelors' level percentage is very low at 1% while masters' level showed a good trend.

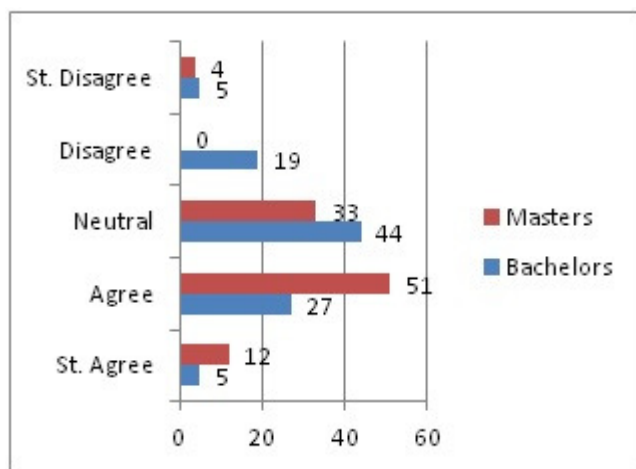


Figure-6
Well formulated course outline

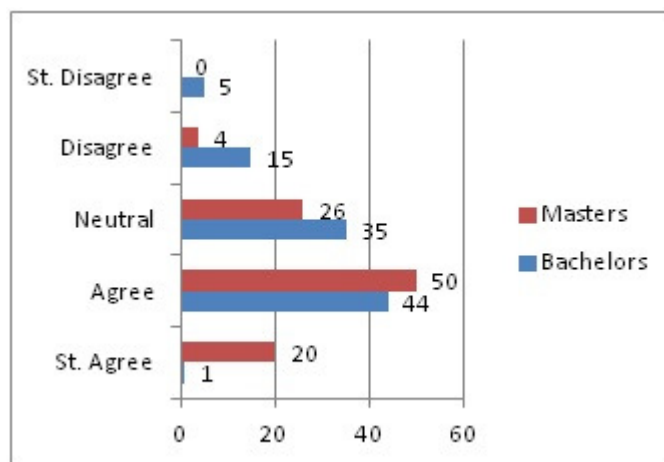


Figure-8
Quality of course outline

In previous paragraph, survey question focused on adequacy of course outline. Now it is checked whether the formulated course outline is followed accordingly or not. It is a big issue in institutions that although teachers make course outlines at the start of the semester but do not follow it during the semester. But in Pakistan a big percentage agreed that their teachers strictly follow that course outline provided in the start of the course. Figure 7 clearly shows percentage of the students that agree to it.

Organization of courses is also an important aspect to discuss. Arrange the courses in cluster and offering them in the right sequence are challenging tasks. It is usually the responsibility of academic management. The management has to make sure that courses are related to the degree and are offered in correct sequence. In the survey, students were asked whether their courses are well organized or not. Figure 9 portrays the results acquired during survey. Almost 50% students at both levels agree to it. However in case of strongly agree, a big difference of 23% students lies between two levels.

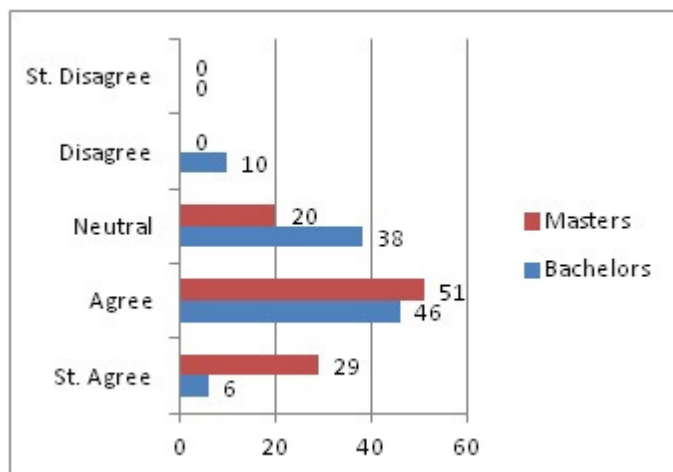


Figure-9
Organization of course

There are different modes by which lectures, notes and other helping material can be given to students. One of the modes is through email/groups. Sharing of informative material through email/groups is very effective since it consumes less time and everyone has easy access to it. In the survey, students were asked about how they get lectures notes or course material. A significant difference is observed between bachelors and masters. 57% of masters' students strongly agree in contrast to 9% bachelors students. 30% bachelors' students showed neutral behaviour while 12% disagree to it.

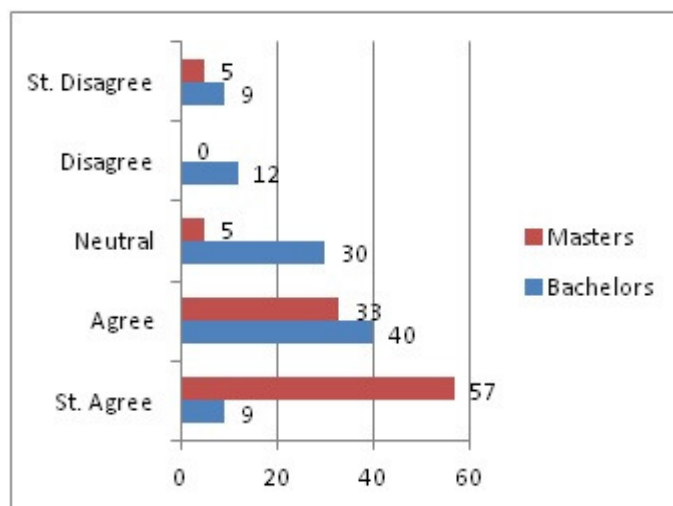


Figure-10
Content sharing by groups

Course workload is an important issue concerning the students who take full course load as designed by the university/institution. It is difficult for the students to manage the workload of multiple courses. In the survey, students were asked whether their course load is manageable or not. The response of the students is shown in the figure 11. Most of the students are unable to manage course workload.

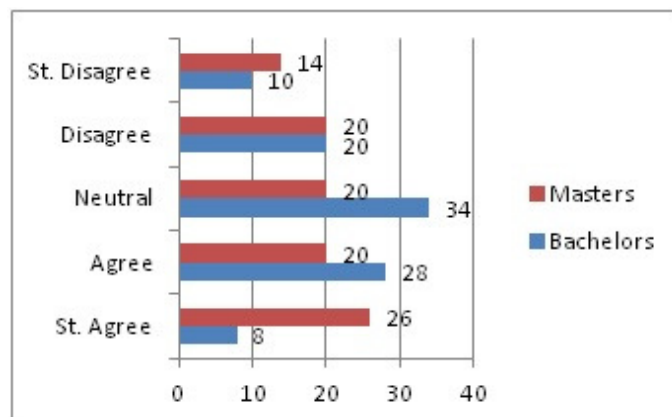


Figure-11
Course workload

Certain objectives of the course is established when a course is offered by a university/institution. One of the objectives is to groom the students to be independent learner. Course can play a vital role in developing independent learning attributes in an individual. Students of both levels were asked about whether they think of themselves as independent learners as a consequence of their course. Figure 12 shows the outcome of the survey question. Majority of the students agree to it, especially masters level students. The ratio of masters' students who strongly agree is almost twice as bachelors' students.

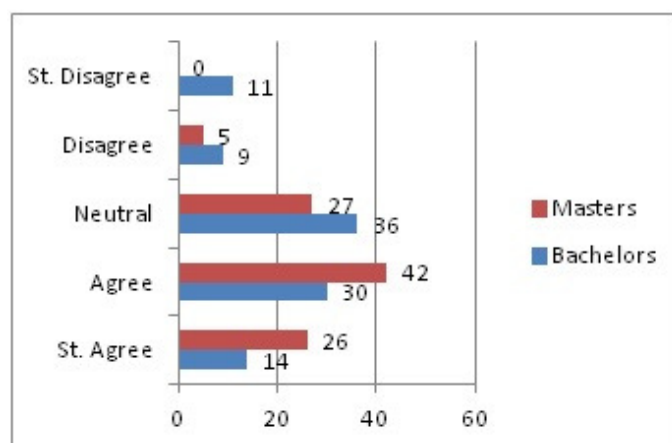


Figure-12
Encourage independent learning

Now we move towards evaluation and assessment mechanisms. In this module respondents were asked about evaluation criteria, format of quizzes and assignments, arrangement of assessments and feedback on assessments. Every institution/university defines its own evaluation criteria and has its policies for assessing the students. Some universities/institutions evaluate on percentage, some has grading system. Weight age of quizzes, assignments, projects, midterm examination, and final term examination will vary from institute to institute. Since there are multiple assessment or evaluation criteria, hence lead to different perception of students about being satisfied by the way they are evaluated.

Quizzes and assignments weigh a major part of a grade. Depending on the nature of subject quizzes and assignments can be either theoretical or practical. But as general trend in Pakistan students are mostly evaluated theoretically. In the survey, students were asked that their evaluation is theoretically or not. The results are shown using a graph in figure 13. It is clearly seen that a major portion of bachelor students stayed neutral. While major portion of masters students agree or strongly agree to it. As mentioned earlier that most evaluations are theoretical that is why a big percentage of both levels agree that their evaluation is theoretical.

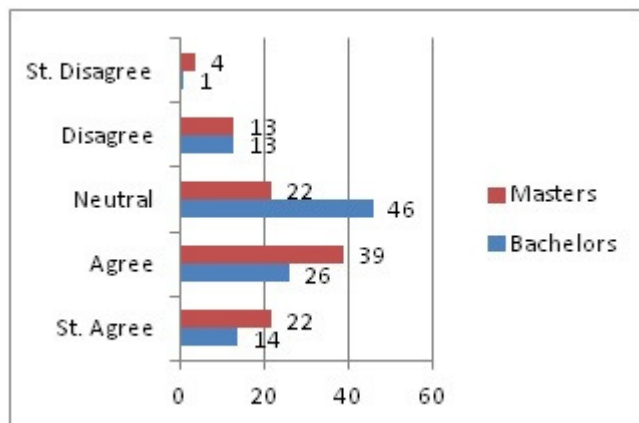


Figure-13
Theoretical nature of evaluation

Students often complain about contradiction between the evaluation criteria communicated at the start and the one that teachers actually follow. Teachers change the weight age of assignments or quizzes and compensate those marks in other activities. Sometimes this flexibility ends up in favour of students and sometimes it goes opposite. In the survey, students were asked about the match between criteria communicated in advance and actually applied criteria. The results are shown in fig. 14. 59% of masters' students agree and 38% of bachelors' students agree to the question. A big percentage of bachelor students showed a neutral behaviour. The percentage, in case of strongly agree, is almost equal.

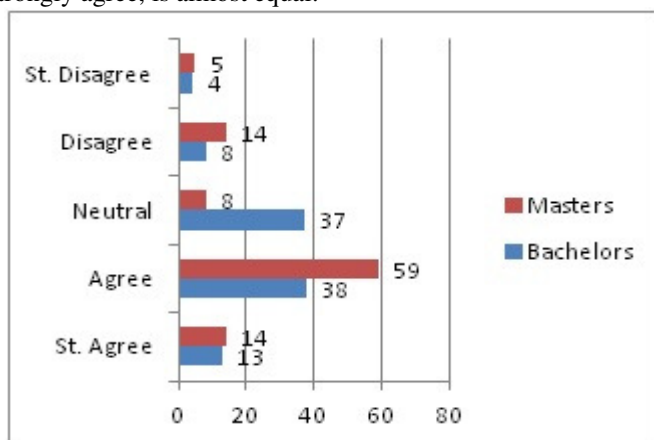


Figure-14
Contradiction in evaluation criteria

It is mostly observed that students are not satisfied by evaluation criteria. One of the reasons may be inappropriate mapping of marks on grade. Also the grade point has significant difference among each other, which leads to student dissatisfaction about GPA calculation. In the survey, Masters' level students showed a very strange behaviour. In fig. 15, it can be seen that where 20% students strongly agree, there are 20% who strongly disagree. While bachelors students showed much of a neutral attitude with a reasonable percentage agreeing and disagreeing.

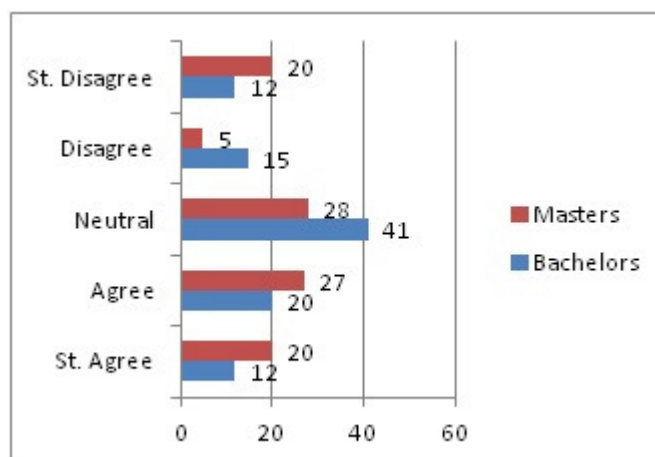


Figure-15
Satisfaction of evaluation criteria

Feedback is a necessary part of learning. Teachers who provide specific, skill related feedback to students assist them in learning the skill at a faster rate¹¹. This will also help them in improving their performance in subsequent evaluations. In the survey, a significant difference is observed between masters and bachelors students. This fact is backed up by figure 16, as it is clearly seen that masters' students agree and strongly agree 54% and 29% respectively. While bachelors level students have percentages 35% and 29% respectively.

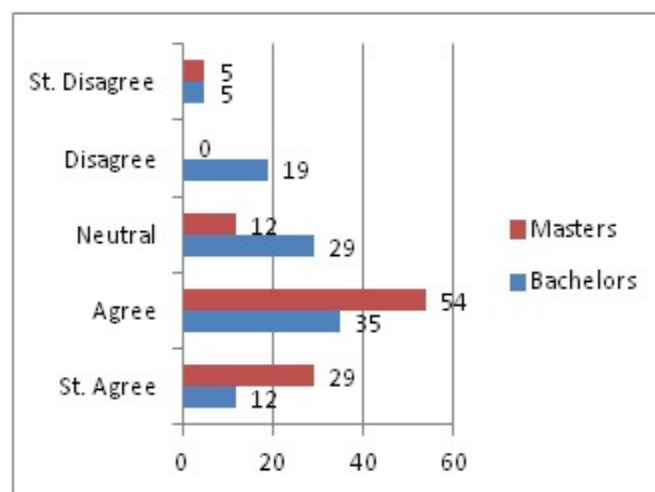


Figure-16
Teacher Feedback

Assessments arrangement and marking of examination are the most concerned areas for students since their grades rely on it. There are different types of assessments that teachers practice depending on the course. For example semester projects, presentations, viva etc. Students often complain about the unfair marking as well. They point to the favouritism and biased behaviour of a teacher. For a teacher, all the students are at the same level but there is a general perception among students that teachers are biased. In the survey, students were asked about their opinion on what they think about their teachers about arranging the assessments and marking them. Figure 17 shows the results of the survey. The percentage is almost equal for both levels when it comes to agreeing to the question. But in case of strongly agree the difference is quite large of 22%.

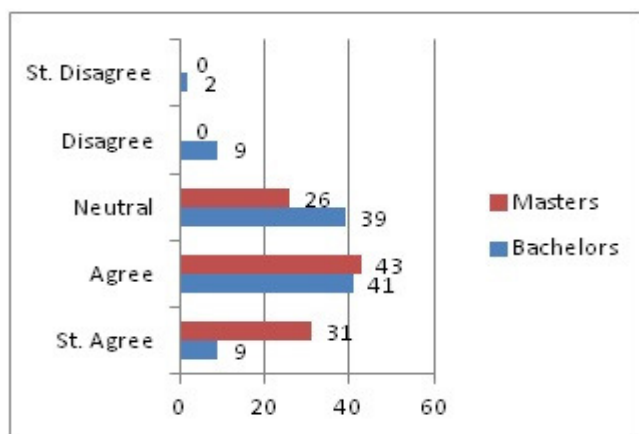


Figure-17
Teacher Feedback

The question of quizzes being announced or unannounced has been brought to table in almost every faculty meeting. Some teachers believe that in order to judge truly, quizzes should be unannounced. However majority of the teachers are sympathetic to students and go for pre-announced quizzes. In the survey a reasonable percentage of students disagree about their quizzes being pre-announced. In each response the difference of percentage is marginal. The facts can be assured by figure 18. Both the level of students showed almost the similar behaviour.

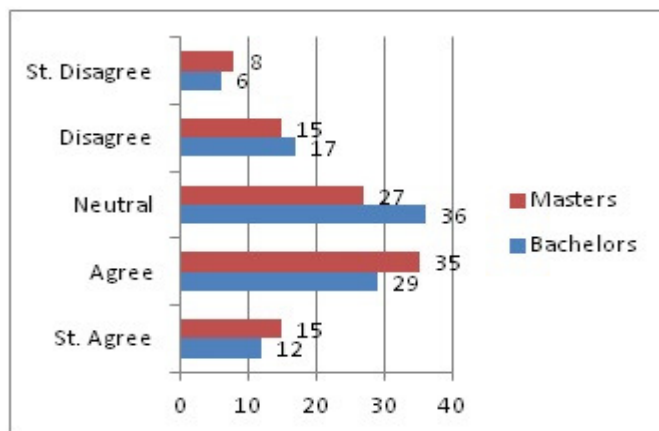


Figure-18
Announced v/s unannounced quizzes

Conclusion

This paper explained the survey on difference in perception of masters and bachelors level students about quality of teaching, courses, evaluation etc. In each question's response, the difference was observed either marginal or significant. A lot of research is going on the area of quality in higher education. The research results presented in this paper can play a significant role in understanding the behaviour of the students^{12, 13}. This paper strongly reflects the students thinking, that can be helpful in formulizing the measures to bring quality education. The results presented here are based on actual survey conducted by the author and the response was taken from multiple universities of Pakistan to raise the quality of research. A wide variety of perceptions can easily be monitored from this study and different measures relating to the issue can be taken. From this research work, certain issues can also be derived that students of both the levels are facing.

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