MOOCs in India: An Investigation about Reasons, Motivations and Valued MOOCs for Indian Students

Anurag Mehra
Indian Institute of Technology Bombay, India

Pramath Kant
Indian Institute of Technology Bombay, India, https://orcid.org/0000-0003-4931-2737

Abstract: Massive Open Online Courses (MOOCs) have become a prominent alternative source of learning for engineering and science students. This rising proclivity for MOOCs among students is based on multiple factors. Several studies have focused on factors that affect MOOCs usage, and most of them have used the Motivation theory. These studies have primarily focused on intrinsic motivations and tangible benefits of MOOCs. However, they have rarely examined why students spend on MOOCs. This paper examines why students are paying only for a certai courses on MOOCs. Our analysis uses the theory of consumption value (TCV) to explain this phenomenon. This study uses a survey method to investigate the students' pursuit of various courses on different MOOC platforms. The survey questionnaire elicited students to share information about MOOCs they have pursued, either free or paid. Our analysis reveals that personal motivations, negative classroom experiences and different learning reasons influence Indian students to pursue MOOCs. The expenditure analysis of students on MOOCs shows that students find Computer Science and Engineering (CSE) courses are more valuable than courses from any other discipline. Finally, we discuss the findings and interpret its implications with respect to future of learning in higher education.

Keywords: Massive Open Online Courses (Moocs), Theory of Consumption Value, Motivation and Reason, Expenditure on Mooc, India

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Introduction

The education technology (Ed-Tech) sector has proliferated in the last decade and Massive Open Online Courses (MOOC) providers have been its significant players worldwide. The rise of private MOOC platforms (e.g. Coursera, Udemy, edX etc.) is attributed to the type of content and courses they provide from the world's

prestigious and elite colleges. Irrespective of time and space, the other advantages of MOOCs such as ease of access and flexibility to learn, make them an attractive alternative source of learning (UNESCO, 2016).

The perceived benefits of MOOCs have resulted in an exponential increase in the number of MOOC learners. By the end of 2021, more than two hundred million people across the world have used MOOCs for learning (Shah, 2021). The phenomenon of MOOC-based learning is on the rise in India, too. Various global MOOC platforms are well known and common among Indian learners (Kundu & Bej, 2020). Besides the global MOOC platforms, India has its own government-funded MOOC platform called SWAYAM. The SWAYAM MOOC platform includes NPTEL Online Certification (NOC), which is also an Indian MOOC specifically meant for engineering and science disciplines.

The growing number of learners along with the variety of MOOC courses dished out by different MOOC platforms draws the inquisition to understand which MOOCs are popular. It also motivates our research to find out the reason for college students paying for MOOCs and the courses for which this has been done. Hence, this study attempts to discover answers to such questions. The study strives to answer the following research questions:

- What are the different motivating factors and reasons which influence the use of MOOCs among Indian engineering and science students?
- What factors affect the selection of MOOCs and MOOC platforms?
- Which discipline of MOOCs have high perceived value and why?
    - Which MOOC platforms are popular for pursuing paid MOOCs?

This study offers new insights into the use of MOOCs in the Indian context and the following contributes to existing research: (i) highlights the specific factors that influence the selection of MOOC courses and MOOC platforms. (ii) Provides insight into popular MOOC courses which students perceive as having a high value. Thus, motivating them to spend money on such MOOC courses.

Literature Review

Motivation and Reasons to use MOOCs

The study of motivations in educational practices has had a long research history. From intrinsic and extrinsic motivations to Self-Determination Theory (Deci & Ryan, 1985; Ryan & Deci, 2000), these frameworks have commonly been referred to for analysis in education. More recently, they have also been used to examine the impact of educational technologies.

Using several motivation theories, MOOCs have been analysed for its effectiveness in learning since its meteoric rise in 2012 (Alshammari, 2022; Bertiz & Hebebci, 2021; Pappano, 2012). Intrinsic motivation, which

is based on 'free-will' and 'self-interest' (Ryan & Deci, 2000) has been used in several researches to study the use of MOOCs. One such study, where the theory of intrinsic motivation (which is linked to deterministic goals) was used, has shown to affect the learning process in MOOCs (Littlejohn et al., 2016). Barak, Watted and Haick studied the learner engagement pattern of MOOCs using intrinsic motivation and self-determination (Barak et al., 2016).

Extrinsic motivation pertains to the instrumentalities leading to meaningful outcomes of an activity (Deci & Ryan, 1985; Ryan & Deci, 2000). In the study on MOOCs, the extrinsic motivation construct has been very useful in assessing the impact on the learning process. Extrinsic motivation to establish a correlation between completion rate and obtaining MOOC certification has been used in some studies (Huang & Hew, 2017; Semenova, 2022). Another study explained the use of MOOCs based on three extrinsic motivating factors viz.career benefits, personal benefits and educational benefits (Watted & Barak, 2018).

Most of the above studies have consistently used several forms of motivation. However, motivation is not the only factor which persuades learners to use MOOC. Sometimes external factors may also encourage students toward MOOCs or online learning. Though certain studies have mentioned factors such as bad classroom experience or lack of infrastructure (Shapiro et al., 2017) as a learning challenge, they do not explain the reasons leading to the rise of such perceptions among learners. Therefore, our study not only ascertains the motivations (intrinsic and extrinsic) of Indian students but also strives to examine the aspects of the classroom learning ecosystem which drive students towards MOOCs and other online learning platforms.

The Valued Choice Framework

One of the theoretical frameworks is the theory of consumption value (TCV) which expounds the consumer behaviour to select and either to purchase or not to purchase a product. Sheth et al. developed TCV with the inspiration to explain the influence over selection of the product purchase and is based on five values viz. functional, conditional, social, emotional and epistemic (Sheth et al., 1991).

The economic and utilitarian benefits experienced from the consumption of a service are the Functional value of TCV. This primarily reflects the economic philosophy of a "rational economic man". Emotional value concerns with a service's ability to *'arouse feelings'* or elicit emotional feelings upon its consumption (Sheth et al., 1991). An alternative (or a service) acquires Social value through its perceived positive or negative stereotyping by social groups. Epistemic value concerns with satiating one's need to acquire knowledge from an alternative or service. When the consumer's choice is contingent on specific conditions or circumstances, it is perceived as Conditional value. For example, the consumer selects or purchases a product because of its seasonal value (Lai et al., 2012; LeBlanc & Nguyen, 1999; Sheth et al., 1991).

There are several studies which have used TCV in higher education research. A study on Chinese students showed functional value as the paramount factor to pursue higher education (Lai et al., 2012). The functional

value was primarily driven by the perceived value of higher education programs having greater employability. The research extended the 'economic rationality' and' utility' argument to the necessity of learning and pursuing future-ready career programs (Lai et al., 2012; Stigler, 1950). Another study by Stafford examined the selection of elective courses in marketing education. This study shows that epistemic and conditional values mainly influence the choice of electives. It was the humdrum situations such as the desire for variety and the hindrance of the schedule of other courses which decided the consumption of elective courses. The finding was startling as it revealed more about the students' perception than what the educators believed (Stafford, 1994).

Method

Data Collection

The data about MOOCs usage among Indian students was gathered using the survey method. The target population for the survey in this study were engineering and science students. Using Stratified Random Sampling, the states and cities of the colleges were identified and selected for the in-person survey. The number of colleges selection for the survey was based on the number of colleges present in the State. Use of MOOCs for learning was the prerequisite for the students to participate in the survey. The data shared by the students is based on their experience of using MOOCs.

Table 1 shows the demographic details of 537 students who participated in our survey. The Goodness of Fit test is significant for all the demographic factors. The student's caste is also included to address the representation of the social status of the students. However, the disclosure of such personal details was purely discretionary. Based on the number of samples and Cochran's sample formula, the survey results provide a 95% confidence level with +/- 5% margin of error (Bartlett II et al., 2001).

Table 4. Demographic Details of the Student Samples

Demographic Details	Level	Count	Proportion (%)
Gender	Male	374	70
	Female	159	30
Caste	General	385	73
	OBC	113	21
	SC/ST	30	6
Type of College	Public	207	39
	Private	330	61

Analytical Methods

Quantitative analytical methods are used to analyse the data collated from the survey. We have used descriptive statistics to analyse the responses to the closed-ended multiple-choice questions and cost analysis of the MOOC

courses paid by the students. The non-parametric Mann-Whitney tests were used for analysing the effect of independent variables on the responses as the responses of the survey and the independent variables are nominal. The tests were conducted using SPSS statistical software, while Tableau was used for descriptive and visual analytics.

Analysis

Factors Contributing to the use of MOOCs among Students

While conducting our survey, it was found that no single factor influences the use of MOOCs. Instead, a confluence of reasons dictates the use of MOOCs among science and engineering students. This section will present reasons and motivations of Indian students to pursue MOOCs revealed in our data analysis.

Reasons

The students had provided many reasons to learn the courses using MOOCs. The survey consisted of multi-choice questions requiring the students to share their reasons for pursuing MOOCs as part of their learning. Figure 1 shows the key reasons reported by the students (number of samples (N) = 537) for pursuing MOOCs. The interaction with the students during the survey emphasized the lack of clarification of doubts in the classrooms and thus is a significant reason to pursue MOOCs. For students, pursuing online learning is a recourse to clarify their doubts and ameliorate their concepts.

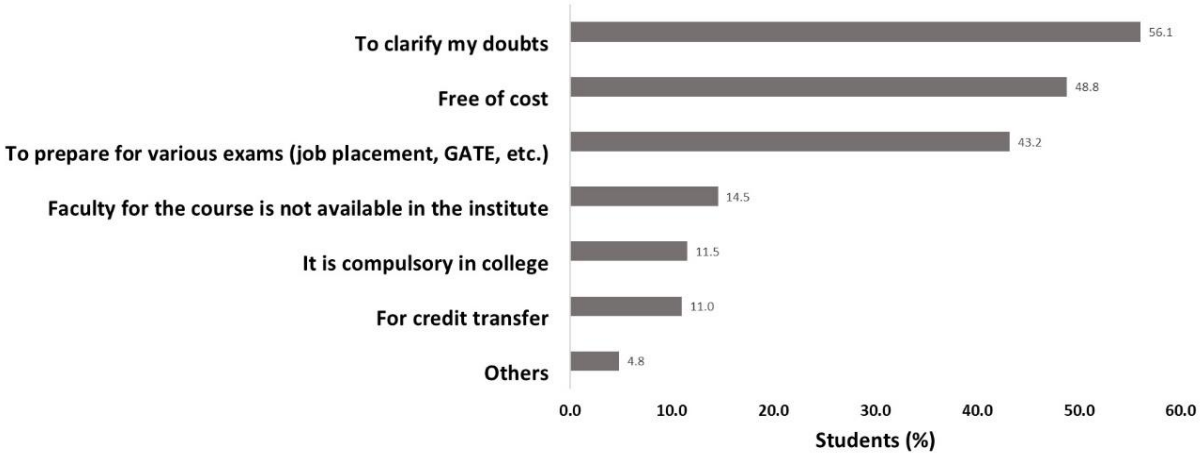

Figure 1. Students' Reasons to pursue MOOCs (N=537)

The cost of MOOCs is an important reason for students to pursue MOOCs. Almost half of the students pursued MOOCs because it is freely available and need not spend extra for learning. An approximately similar percentage of students use MOOCs, either free or paid, to prepare for various examinations. These examinations can be following but no limited to: post-graduate entrance examinations, job placements, their regular degree course examinations, etc.. Faculty not being available in the institute for a particular course also contributes to

the reasons for some students to pursue a course on MOOCs.

When we analysed the data against two independent variables, i.e. college/institutes and gender as independent variables, we found certain factors dominating the two variables. In the case of the type of college/institute, students of public institutions (N=207, 64.3%) are more likely to pursue MOOCs to *'clarify'* their doubts as compared to students of private institutions (N=330, ~51%) and this difference is statistically significant (N=537, $\chi^2 = 7.941$, d.f. = 1, p = 0.005). The students of public institutes/colleges (N=207, 14%) are more likely to pursue MOOCs for '*credit transfer'* than students of private institutes/colleges (N=330, 9%) though not statistically significant. Students of private colleges (N=330, 13.3%) are more likely to pursue MOOCs due to their institute making it *'compulsory in college*' than public colleges (N=207, 8.7%).

Considering the gender variable, the analysis does not reveal much difference between them, but for two reasons. The analysis shows that male students (N=373, 16.4%) are more likely to pursue MOOCs because of the unavailability of the faculty for a particular course than female students (N=159, 10.7%). Female students (N=159, ~59.7%) are more likely to pursue MOOCs to 'clarify' their doubts than male students (N=373, ~53.6%). However, both the observations are not statistically significant.

Motivations

Motivation, by definition, is driven by an internal desire to achieve actualisation. Figure 2 shows different motivations of the students to use MOOCs for their learning. The data reflects the rising aspirations of students to enhance existing knowledge and also learn newer subjects of different subject matter. Apart from the desire to increase knowledge, the students also recognise the need to gain and learn new skills, which will make them employable.

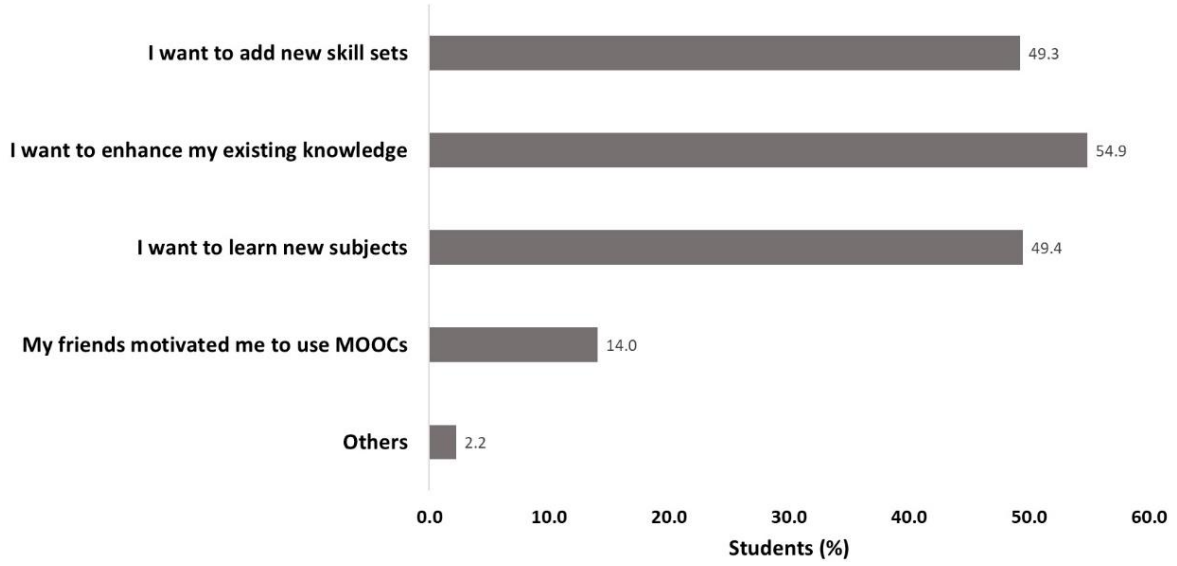

Figure 2. Different Motivations to Pursue MOOCs (N=534)

The statistical test of the responses for different independent variables did not show any significant results, but for one. A Kruskal-Wallis test on responses for the caste variable showed statistically significant results for the response *'I want to add new skill test'* ($\chi^2 = 6.506$, df = 2, p = 0.039). The test results reflect that the acceptance of the importance of building new skills is less among the students of SC/ST (38%) and OBC (40%) category as compared to General category students (52%).

Negative Classroom Experience

Students' internal motivations and reasons are not the only factors driving them to opt for MOOCs for learning. Our survey also examined whether students' classroom learning experience affects their decision to refer to online learning content. Figure 3 illustrates various negative classroom learning experiences of the students, which may have contributed to their online content pursuit. Almost half of the students responding to the question felt that the content taught to them in the classroom was insufficient. There can be several reasons for feeling discontent about content which could be

(i) an incomplete syllabus,
(ii) instructors rushing up the lectures and skipping the necessary content and
(iii) the syllabus being outdated or inadequate to meet the job requirements available in the market.

The figure highlights an important reason which can explain the growing reliance on learning through MOOCs. The data shows that one out of the three students believes '*Teacher is not a good instructor*.' However, we believe this data is conservative as many students shared their opinion verbally but were reluctant to mark them on the survey form.

The students' response raises questions about the capability of the faculty and their specific teaching and pedagogical skills. Inadvertently, it highlights an alarming shortage of quality faculty in institutes across the country. The analysis implies that even though the institutes and colleges have the physical infrastructure, they do not have adequate quality human resources for teaching.

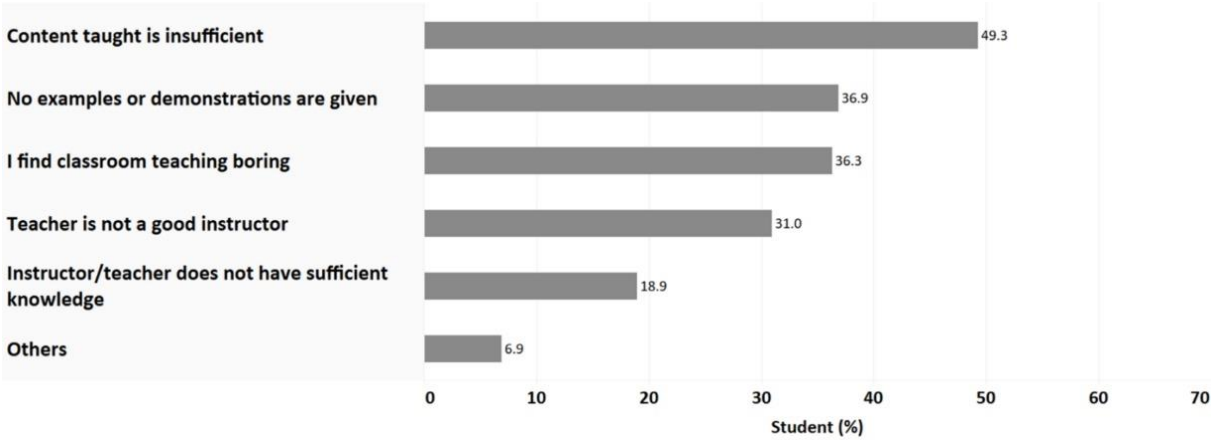

Figure 3. Negative Classroom Experiences of Students leading to the use of MOOCs (N=507)

Table 5. Negative Classroom Experience Response Distribution based on Gender and Type of College

Classroom Learning Experience	Gender		Type of Institute	
	Female (N=152)	Male (N=352)	Private (N=306)	Public (N=201)
Content taught is insufficient	59.6	45.2	48.4	50.7
No examples or demonstrations are given	37.1	36.6	35.9	38.3
I find classroom teaching boring	29.8	38.9	41.5	28.4
Teacher is not a good instructor	31.1	31.0	33.0	27.9
Instructor/teacher does not have sufficient knowledge	23.2	16.8	20.6	16.4
Others	6.0	7.4	4.9	10

The students also highlighted the lack of examples or live demonstrations in the classroom. The data indicates that students pursued online courses or MOOCs to understand the subject with more clarity as they provide better and enhanced illustrative concepts with animations and simulations, which otherwise is absent in classroom teaching. An almost similar percentage of students also felt that classroom teaching is boring. Though there is no correlation between the former and latter reasons, it can be implied from the data that students think classroom teaching is tedious due to a lack of practical concepts or demonstrations.

A Mann-Whitney test indicated female students are more likely to feel the *'Content taught is insufficient'* compared to male students (U = 22740.5, p = 0.003, Z = -2.964, r = -0.13). Also, the perception among female students as per the analysis highlights that the instructors or teachers are not having 'sufficient knowledge' as against male students, though the difference is not statistically significant (refer to Table 2). As far as students of private colleges are concerned, they are more likely to feel bored with classroom teaching than students of public colleges (U = 26710.5, p = 0.003, Z = -3.008, r = -0.133). There is almost consensus among private and public college students for a negative class learning experience for the rest of the responses.

Table 3. Correlation Matrix of Factors leading to Negative Classroom Experiences

Classroom Learning Experience	Coefficient	Teacher is not a good instructor	I find classroom teaching boring	Content taught is insufficient	No examples or demonstrations are given	Instructor/ teacher does not have sufficient knowledge
Teacher is not a	Spearman's rho	1	0.009	-0.004	.151**	.395**
good instructor	p-value	.	0.839	0.936	0.001	0
I find classroom	Spearman's rho	0.009	1	-.186**	-0.05	0.033
teaching boring	p-value	0.839	.	0	0.262	0.457
Content taught	Spearman's rho	-0.004	-.186**	1	-0.002	.107*

Classroom Learning Experience	Coefficient	Teacher is not a good instructor	I find classroom teaching boring	Content taught is insufficient	No examples or demonstrations are given	Instructor/ teacher does not have sufficient knowledge
is insufficient	p-value	0.936	0	.	0.969	0.016
No examples or demonstrations are given	Spearman's rho	.151**	-0.05	-0.002	1	.152**
	p-value	0.001	0.262	0.969	.	0.001
Instructor/teacher does not have sufficient knowledge	Spearman's rho	.395**	0.033	.107*	.152**	1
	p-value	0	0.457	0.016	0.001	.

Table 3 shows the correlation matrix for the factors which lead to negative classroom experiences among students. Evidently, students perceive a teacher as not a good instructor either if he/she does not provide demonstrations to explain the problem at hand, or does not have sufficient knowledge or both. There is also a significant correlation between content taught is insufficient and teacher does not have sufficient knowledge. The relation is expected because of obvious reason. Similar inference is also valid for the correlation observed between content taught is insufficient and absence of examples or demonstrations.

Students' Perceived Value of MOOCs

What is there in paid MOOCs?

In our sample of over 500 students, around 425 students shared information about the MOOCs/Online courses they pursued or were pursuing then. 175 (41.2%) out of 425 students had paid for the MOOCs courses they pursued. The data shows that at least one out of the three students pursuing MOOCs is likely to pay for a MOOC. Among the 175 students, 54.3% of students paid for only one MOOC, 24% of students paid for two MOOCs and 21.7% of students paid for at least three MOOCs. The data shows that if a student is paying for two MOOC courses, they will likely be motivated to pursue further paid MOOCs.

Table 4. Popular Paid MOOC Platforms used by Indian Students

Paid MOOCs Platforms	Students using MOOCs
NPTEL	67.40%
Udemy	20.00%
Coursera	6.30%
SWAYAM	6.30%

Paid MOOCs Platforms	Students using MOOCs
Internshala	4.60%
edX	3.40%
Udacity	1.10%
Mycaptain	0.60%
Autodesk	0.60%
Bharat Acharya	0.60%
Coding Blocks	0.60%
MauriSilicon	0.60%
NIIT	0.60%
Oracle	0.60%
Paathshala.com	0.60%
Unacademy	0.60%

As students are spending money to pursue MOOCs apart from their expenditure on regular classroom degree programs, it becomes pertinent to ascertain those MOOC courses for which the students are paying. Thus, the survey focused on eliciting information on MOOC courses and the platforms for which the students paid and pursued their learning. Table 4 shows the list of paid MOOCs platforms selected by the students. The data reflects the popularity of MOOCs platforms among students. However, the data of students pursuing paid MOOCs and the list of MOOCs are mutually inclusive (i.e. a student may have pursued different MOOCs of the same course from different MOOC platforms). NPTEL is the most popular MOOCs platform among for students pursuing paid MOOCs. Udemy and Coursera are private MOOCs platforms which are popular for pursuing paid courses. NPTEL and SWAYAM were different public MOOC platforms at the time of the survey; however, since 2021, the former has been subsumed by the latter. The distribution of various disciplines of paid MOOC courses pursued by the students is shown in Table 5. The data elucidates that most paid courses pertain to Computer Science and Engineering (CSE ~60%) while ~20% of the paid courses are Professional Communication courses. Humanities and Social Sciences, Mechanical Engineering and Electronics Engineering courses each constitute approximately 5% of the paid MOOCs. The remaining percentage distribution of other disciplines is shown in Table 5. Most engineering students pay for CSE courses on MOOCs platforms irrespective of their pursued discipline in undergraduate/post-graduate programs. The data also showed that approximately 50% of CSE paid courses were programming courses: Python and C Programming being the majority of them. Machine learning and Artificial Intelligence courses constituted 10% of the paid CSE MOOCs. With the evidence showing a majority of paid MOOCs being from CSE and Professional Communication courses, it becomes equally important to ascertain the kind of money students spend on these paid MOOCs. Figure 4 shows the box plot of students' cumulative spending on MOOCs for the five disciplines. The data on students' spending is most scattered for CSE MOOCs with a higher percentage of students spending beyond the median expenditure of Rs.1200 (~$15) as compared to all other MOOC disciplines. It further provides evidence that students value CSE MOOCs more than any other discipline and they are willing to spend

more on these courses. Electronics Engineering and Mechanical Engineering, too, have students spending beyond the median of Rs.1100 (~$14), albeit lesser in magnitude than CSE. This emphasises that the perception of students to acquire core knowledge of their discipline is as per their needs.

Table 5. Percentage Distribution of Different Discipline of Paid MOOCs used by Students

Discipline of Paid MOOCs	Paid Courses (%)
Computer Science Engineering	60.10%
Professional Communication	19.20%
Mechanical Engineering	5.40%
Humanities and Social Sciences	5.10%
Electronics Engineering	4.50%
Zoology	1.60%
Electrical Engineering	1.30%
Management	1.00%
Biotechnology	0.60%
Design	0.30%
Electronics and Telecommunication Engineering	0.30%
Metallurgy Engineering	0.30%
Physics	0.30%

With the data highlighting the CSE MOOCs as popular discipline for students, it motivated us to find which courses of CSE are contributing to high spending. Figure 5 shows the expenditure distribution of students for different CSE courses. Evidently, most of the students are spending on programming courses followed by Artificial Intelligence and Machine Learning (AI &ML). Programming has the highest average spending mean compared to other CSE MOOCs. The data highlights the value of programming courses for the students and the importance to build programming skills.

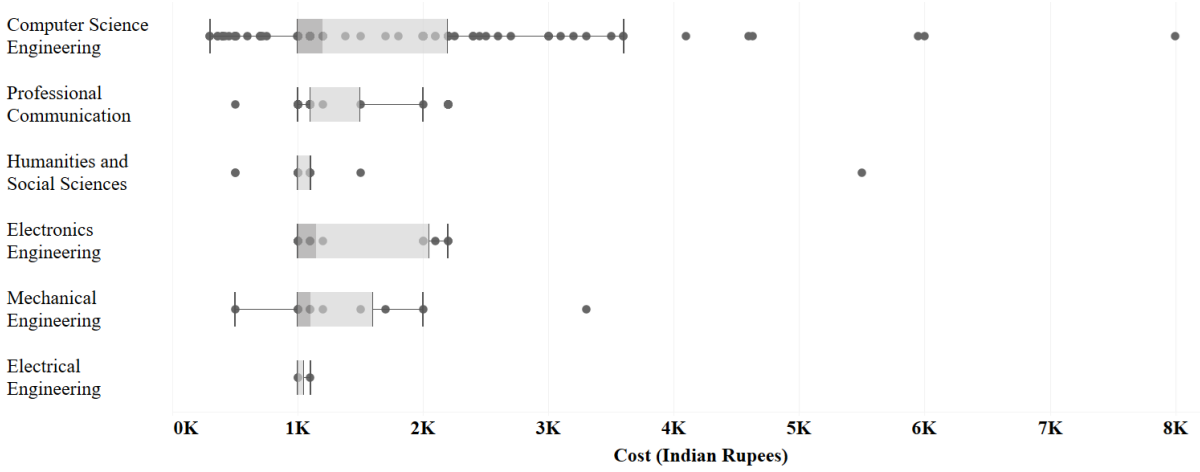

Figure 4: Expenditure of Students for Different MOOC Disciplines

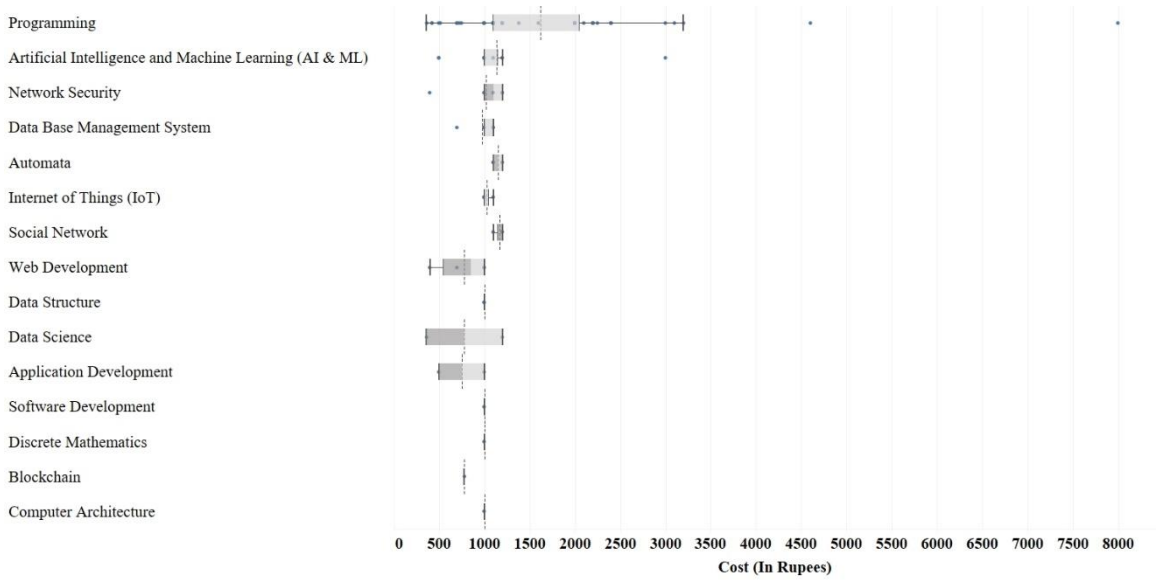

Figure 5. Expenditure of Students on Different Types of CSE MOOCs

Factors influencing the selection of MOOCs

Motivation and reasons are integral aspects for the use of MOOCs among students. But equally important are the factors which influence the selection of MOOCs amongst a plethora of MOOCs provided by different MOOC platforms. This section will elucidate different factors which influence the selection of MOOCs among Indian students. Figure 6 shows the major influencing factors in the selection of MOOCs. Among Indian engineering and science students, developing '*skills*' is the most crucial factor in selecting a course on a MOOC platform and possibly paying for it. Cost is a vital factor which influences the selection of MOOCs among students. In our survey, the choice of the instructor of a MOOC is another factor which got reflected as one out of the three students check about the instructor before pursuing a MOOC. The role of faculty is also crucial, as approximately one out of three students listen to their faculty's recommendations when selecting MOOCs.

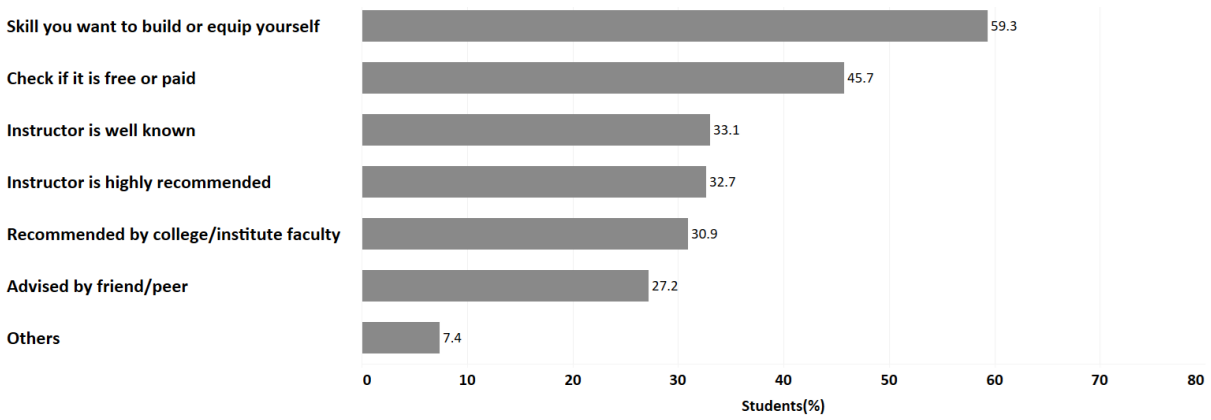

Figure 6. Factors Influencing the Selection of MOOCs (N=514)

Factors that Influence the Choice of Paid MOOCs

Examination of the data on popular MOOC courses and MOOC platforms raises question on the factors influencing the selection of a MOOC platform or a MOOC course. The analysis provided in the previous section revealed that almost 80% of paid MOOCs are from Computer Science and Engineering (CSE) and Professional Communication courses. This section delves in finding the factors that influence MOOC courses' selection from the two disciplines of MOOCs.

Table 6 shows the list of factors that influence the selection of MOOC courses or MOOC platforms for CSE and Professional Communication courses. Skilling or building digital and information technology (IT) based skills is paramount for students when selecting MOOCs for CSE and Professional Communication courses but is more dominant in CSE MOOCs. It also reflects that irrespective of the discipline the students pursue in undergraduate or post-graduate studies, they realise the importance of having IT and CSE skills, mainly computer programming skills. The importance of the instructor teaching the course on MOOCs is another critical factor.

As far as Professional Communication MOOCs are concerned, apart from skill development, the role of colleges and institutes too influences the selection of MOOCs (as shown in Table 6). The increase of 20% in the factor *'Recommended by college/institute faculty'* for Professional Communication MOOCs compared with CSE MOOCs can be due to the policies of All India Council for Technical Education (AICTE) and State Technical Education board. Many state technical and private universities/colleges have mandated completion of Professional Communication courses via NPTEL/SWAYAM. This has also been reflected in our data, where all the paid Professional Communication courses pursued by the students are from NPTEL/SWAYAM.

Table 6. Factors Influencing the Selection of Paid CSE and Professional Communication MOOCs

Factors Influencing selection of MOOCs	Computer Science and Engineering (CSE)	Professional Communication
Skill you want to build or equip yourself	77.1	66.0
Instructor is highly recommended	40.4	14.9
Check if it is free or paid	34.9	19.1
Instructor is well known	30.3	19.1
Recommended by college/institute faculty	29.4	48.9
Advised by friend/peer	23.9	14.9
Others	7.3	6.4

Discussion

Motivations, Reasons and Previous Classroom Learning Experience Influencing use of MOOCs

Among Indian learners, the adoption of MOOCs is dependent on various factors, as has been described in the

analysis section. Hence, the findings warrant a discussion which can explicate the analysis in the context of the literature available on motivations to use MOOCs. Our study explains the reasoning for the use of MOOCs among Indian science and engineering students and shows two contexts, i.e. intrinsic motivation and external factors.

The impetus of intrinsic motivation among students is based on two factors. The first factor reflects the motivation to build skills which can enhance their employability and the second factor focuses on the students need of fulfilling their aim of enhancing knowledge. At the same time, these students are also striving to explore new domains of knowledge using MOOCs. Our findings are consistent with the previous findings on intrinsic motivations to pursue MOOCs (DeBoer et al., 2013; Dillahunt et al., 2016; Watted & Barak, 2018).

Most of the MOOCs without certificates are free of cost. It makes the MOOC platforms an ideal learning resource and a possible alternative to classroom learning. Nearly half of the students mentioned 'Free of cost' as an essential feature of MOOCs to pursue its courses. It also underlines the importance of access to quality education which most of the Indian students need.

The ineptitude of the institutes to provide quality higher education was also reflected in our analysis. There are several observations which support the former argument. Over 40% of students stated the necessity to prepare for various examinations as the reason to use MOOCs or other online learning resources. These examinations include job placements, GATE examinations, semester examinations, etc. The analysis further highlights the exasperating problem of quality learning and skill development in professional courses. The students pursue online courses as they are not acquiring skills that would get them jobs or the manner in which the courses are taught cannot help them qualify for the relevant examinations. The data inadvertently also emphasises the need to upgrade the human resource to the new age courses and train the faculty.

The other extrinsic reason (or factor) which our survey elicited focus on the role of the classroom learning experience. Even though Shapiro et al. highlighted the lousy experience in learning as a reason to pursue MOOCs (Shapiro et al., 2017), it fails to elaborate the causes of a bad experience. Our finding highlights multiple reasons leading to negative classroom learning experiences which influence Indian students to pursue MOOCs. The analysis helps in explicating the learning environment of classrooms across Indian colleges and universities. The students perceive lack of practical demonstrations, lack of updated knowledge among faculty and inefficient teaching as critical factors which lead to negative classroom experiences. These factors are also correlated with each other as shown in our analysis. The negative experiences are perceived more among female students than male students. MOOCs, for such students, have become a convenient alternative to accomplish their learning goals.

Valued MOOCs

A key objective of this study was to find out which MOOCs students value more. Based on our findings, the

perceived value of MOOCs underlies two different aspects i.e. the student's willingness to pay for MOOCs and the reasons for selecting such MOOCs. Based on these two key factors, we understand that that three TCV factors play a major role in the use of MOOCs viz. Functional, Conditional and Epistemic values.

In India, job opportunities are increasing exponentially in the sector of digital technologies. As per Nasscom, the demand for digital talent jobs is expected to rise by twenty times the current demand (Nasscom, 2020). Therefore, the industry demand for students having digital skills, such as Artificial Intelligence, Data Science, Data Analyst and Software Engineering is swelling (Coursera, 2022).

Our analysis reflects the recognition among students to equip themselves with desired digital technology skills for better employability. Therefore, most students are paying more for CSE MOOCs irrespective of their undergraduate/graduate discipline in degree programs. Thus, MOOCs on CSE courses reflect students' perceived function value and also reflected within CSE MOOCs especially in programming and AI & ML courses as more students are spending on these courses.

Considering that most Indians are from middle and lower income (Chancel et al., 2022), spending money beyond regular college tuition fees is a significant investment. Our analysis shows that students are judicious when spending money on MOOCs. The selection of paid MOOCs and its platform is predominantly decided by the skills (digital / communication skill) the student intends to develop. On the other hand, students shelling out extra money for MOOCs exposes the chasm between the syllabus of the technical courses taught and the necessary skills required for modern jobs. The implication of the data underscores the need to restructure higher education and the syllabus taught. Contemporary professional and technical education should be able to cater to the market's needs.

The students also pursue paid MOOCs because of its conditional value. Many Indian higher education institutions are implementing the government's MOOC policy in their degree programs AICTE (Credit Framework for online learning course through SWAYAM) Regulations 2016, 2016). Several colleges and universities have mandated the use of NPTEL and SWAYAM MOOCs as part of degree programs (AKTU, 2018; MAKAUT, 2018; SVUCE, 2020). The MOOCs on professional communication courses are an example which reflects the conditional value of MOOCs. These courses as now mandated by the colleges to be completed through MOOCs.

The students attach Epistemic value to MOOCs for self-learning. This observation is based on reasons given by the students for using MOOCs in our survey. The evidence from the analysis shows that Indian students are mostly using MOOCs to clarify their doubts, prepare for various entrance examinations and to enhance their knowledge. In addition, the negative classroom learning experiences resulting from the lack of relevant content taught in classrooms and practical learning are compelling students to use MOOCs. Thus, underscoring the Epistemic value of MOOCs as an alternative source of learning.

Conclusion

MOOCs many studies have examined the motivations and reasons for learners to pursue in the literature. However, those studies have not focused on external factors of students which drive them towards MOOCs. This paper found two critical factors of MOOC-based learning prevalent among Indian students. One of the factors is what persuades them to pursue MOOCs and the MOOCs which the students find valuable enough to spend money. Our analysis showed that internal motivations lead by the need to build employable skills are important factors for selecting MOOCs. Another factor which influences students to pursue MOOCs is their experience of classroom learning. Negative classroom learning experiences, such as lack of practical learning and teachers' lackadaisical pedagogy, turn students towards MOOC-based learning.

Second part of the analysis presented an assessment of the spending pattern of the students for different MOOCs. This analysis used the theory of consumption value to examine the perceptual reasons for the spending pattern. The students' spending on MOOCs is based on its functional, conditional and epistemic value. They mostly pay for CSE MOOCs because it has a perceived functional and epistemic value. The expenditure of students on MOOCs is also driven because they have a conditional value as well (to fulfil degree requirements).

The findings presented in the paper are based on the survey of Indian students of science and engineering disciplines. Their beliefs about MOOCs and need to use them are driven by the factors which apply in the Indian context. Therefore, the findings cannot be generalised to students of other disciplines/degree programs or to students across the world. However, this paper can help provide inputs to analyse the impact of MOOCs and find out the value of MOOC-based online courses from the learners' point of view.

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