			starting point for improvements
4	Act	Improvements	Adding new content, making content contemporary, increasing/decreasing of weightage of assignments/tests/mini-projects

Table 6 gives the improvements done over different editions of the course as an application of PDCA cycle.

Table 6. Improvements carried out

Sn	Edition	Improvement over the previous edition	Comment
1.	I (2019-II Sem)	-	Organized well Offline mode Intense interaction Taken as a baseline course
2.	II (2020- I Sem)	Asynchronous modes, sessions through MS Teams Attendance rule abolished Exams MCQ based	Organized in an ad-hoc manner, Environment full of negativity Examination questions were rudimentary
3.	III (2020-II Sem)	Examination through Moodle involving Small cases on Indian Organizations tackling the Covid challenge introduced Exam MCQ + Open-ended questions	Accepted the fact that online is going to be the way of teaching-learning
4.	IV (2021- I Sem)	Other online resources used (like NPTEL, Moocs courses) A few TED/TEDx talks introduced Focus on FMCG and cold SC Introduced Circular Economy models economy because of COP26	Organized well Developed question bank Making material contemporary and in tune with changing times
5.	V (2021- II Sem)	Expanded TED/TEDx talks as an additional resource Focus on resilient and tolerant SC Assignments with a focus on Covid response Introduced disaster SC in view of the Russia-Ukraine war Offline exams allowed the use of long descriptive questions	Extensive question bank Comfortable in handling online mode Developed a mature set of assignments and evaluation scheme Developed rubrics for every assignment

4. Competencies expected

One would expect to enhance his/her competencies in various domains after undergoing the course of SCM.At the end of the semester, what do we expect students to learn? Getting good grades (marks) is just one outcome. However, as an investment of about 36 hours, one would expect the students to gain the following competencies.

4.1 Familiarity with various terms used

Typically, a course exposes students to about 90-100 concepts in a course (see Bouru (2022) mentions about 95-100 concepts in an undergraduate course). It is expected that students are thoroughly familiar with at least 50 % of the concepts in SCM.

4.2 Appreciation of various frameworks

The course exposes students to various frameworks (such as Push-pull, Kraljik's framework, Fisher's framework, SCOR framework etc.). It is expected that the students gain an appreciation of these frameworks in understanding the whole gamut of various processes as envisaged in the SCOR model.

4.3 Ability to articulate justification

It is expected that students will be able to justify various decisions in SCM. This decision could be based on sound articulation via a set of arguments and/or with some quantitative analysis. The following are indicative of such situations:

i. Justification for Make-vs-Buy
ii. Justification for use of selective inventory control (like ABC, FSN. VED etc.)
iii. Justification for forecasting method (say exponential smoothening vs moving average vs liner/non-linear regression etc.)
iv. Justification for cross-docking
v. Justification for selection of transportation mode(s)

4.4 Able to relate to good cases

The students should be able to relate to best practices /leading examples of successful SCM. The students are exposed to the practices followed by Best 25 SC (such as Cisco, Amazon, P&G etc.) as published by the Gartner group. The students are also exposed to leading examples in Indian settings (like Amul, Patanjali, Parle, etc.)

4.5 Understand the complexity

It is the management practice that is relevant from the implementation point of view. Any implementation (whether it is the SCOR model, a typical transportation model etc.) requires an acute understanding of the context and culture where it is to be applied. The complexity in SC could be due to the following: Scale, Size, Scope, Speed, Skillset, Mindset etc.
Students were exposed to each of these.

4.6 Enhancement in skillset

The course is designed in a way that it acts as a launchpad for students who will be opting for a career in SC, Logistics etc. It is expected that students should also enhance their soft skillset. According to Bak et al. (2019), the changing competitive global environment indicated the increasing need for supply chain soft skills with emphasis placed on behavioral, decision making and management skills as critical in soft skills. Specifically, behavioral skills such as communication, planning, initiative, and negotiation were seen to be more important when compared to decision-making, negotiation, and management skills. The changing supply chain scope encourages the requisition and development of different supply chain soft skills with varying levels of emphasis on 15 soft skills identified in the literature. Table 7 presents these skills and the mechanism by which these are to be enhanced.

Table 7. Soft Skills Expected

Sn	Skill	Evidence through
1.	Problem-solving	Various numerical assignments, case studies, role-playing
2.	Planning skills	Planning for team, deadlines
3.	Flexibility	Accommodating team members
4.	Organizational skills	Organization of team, reports, presentations
5.	Communication skills	Short reports, ppt, Video presentations, assignments
6.	Time Management	Timely submission of term work,
7.	Motivation and Enthusiasm	Keeping the morale of team members
8.	Stress Management	Working with tight deadlines and managing submissions
9.	Initiative	Initiative in-class participation, the novelty of themes chosen
10	People Management	Keeping the team together, complementing each other,
11	Collaborative learning	Syndicate exercises, Mini Project,
12	Teamwork	Team submission of assignments, Mini Project
13	Leadership skills	Exhibition of leadership traits in class, teamwork, liaison with alumni
14	Management of complexity and change	Sensitization about the complexity due to size/scale/scope etc, VUCA environment, especially due to covid-19
15	Negotiation	Negotiate about the deadlines, interact with alumni etc.

5. Role of students

One dilemma comes up about identifying the student's role. This question is especially important in an online mode. Is the student the consumer or the producer?

Student-as-a-consumer: The perception of "consumer" is a buyer of a product or service. Students take classes, consume meals, buy books, and use many services for which they pay tuition and fees. The student certainly fits this definition of the word "consumer". The student is buying a professor's course and has the unmistakable right to expect, certain things for his/her money: Relevant course content, fairness, access, expertise, and a reasonable learning situation. Most frequently, external consumers have the freedom to choose their supplier, and in fact, they do so. This is not true for internal customers in an educational institute like IIT Delhi.

According to McCulloch (2009), the 'student as consumer alone" is inadequate because it:

i. overemphasizes one aspect of the student's role and of the university's mission.
ii. suggests undue distance between the student and the educational process, thereby de-emphasizing the student's role in learning.
iii. encourages passivity on the part of the student.
iv. fails to encourage deep learning.
v. implies in the student a level of knowledge and information, and the possession of tools to use them, that are unlikely to be present.
vi. compartmentalizes the educational experience as 'product' rather than 'process'; and

As rightly observed by Gupta et al. (2021), student-teacher duality implies that the overall quality of teaching-learning is dependent on both -the teacher and student quality.

Students are both the consumer and the co-producer: Clearly, the teachers' most important customer is the student. A student does not only consume the final product (therefore, are customers), but also participates in its production (therefore, is a co-producer or employee). It becomes evident that the student is not the product. The real product is the learning of the students (Sytsma, 1996). Learning is a team effort between the teacher and the student. Jointly, they produce a product, that is the learning for the student. Both parties are responsible participants in that process. Broadly speaking, it is a multi-faceted effort on the part of all constituencies -- students, parents, alumnae, the community, and the faculty.

Table 8 depicts a variety of co-production activities (both in the classroom and out-of-the classroom). It may be seen that out-of-the-classroom co-production activities assume predominance in the online mode.

Table 8. Student co-production activities related to learning/teaching*

Type		Activity
Out-of-class co-production	Individual activities	Studying for tests/quizzes
		Reviewing class notes/presentations
		Consulting Teaching assistants
	Group based activities	Participating in group assignments
		Participating in group mini-projects- preparing reports, preparing presentations, preparing videos
In-class co-production		Class attendance Notes taking Asking questions and participating in discussion Behavior towards other students in the class

*Adapted from Kotze and Plessis (2003)

This fact coupled with the following points, tempts us to take a view that students are also co-producers.

i. Continuing advances in digital technologies, social media, and mobile devices such as smartphones/tablets give the student much more control over access to and the creation and sharing of knowledge. This empowers students and helps to increase their motivation and engagement. Digital media, YouTube videos such as TED talks and,

increasingly, open educational resources in the form of animations, simulations (for example Bull-Whip effect), virtual labs enable instructors and students to access and apply knowledge in a wide variety of ways.

ii. The Online mode provided flexibility and wide access to resources (such as NPTEL quizzes, Tedx, YouTube videos etc.) and experts (Not only IIT Delhi, but NPTEL courses offered by IIT Roorkee, IISC Bangalore etc.).

iii. In the online mode, the instructor is no longer responsible for delivering all of the contents or even providing all of the sources for learning. He/she may be perceived as facilitator and assessor of the learning.

The teacher based on his/her experience and expertise as a producer is the one who develops the plan for learning and the course content. The student, as a co-producer and consumer, will focus on the teaching & learning process.

If a teacher views the student as a consumer, he/she will be more tolerant, more interested in implementing ways to improve the learning process, more accessible, and more student friendly. A teacher needs to empathize with students, especially during Covid-19 time.

We feel that all the above perspectives, student-as-a-consumer, and student-as-a-co-producer are valid in online teaching mode.

6. Observations and Insights

a) In a typical offline course, there is a discipline (due to attendance requirements, regular physical interaction with teacher/teaching assistants etc.) in the teaching-learning process. This discipline guarantees that learning takes place regularly. However, this type of discipline is difficult to visualize in an online mode. However, if the teacher engages the students in interesting activities, a learning efficiency that is like that of the offline mode may be obtained. As a result, an online curriculum must also force students to learn via reasoning and to work independently on homework assignments while a teacher monitors their progress. The idea behind assignments and mini projects was to engage students in meaningful activities.

b) The target audience for the course was final-year undergraduate students and master's students. The course contents (assignments and other activities) were redesigned in such a way that these students will be able to work independently and without much support in a typical classroom mode. It was felt that the online mode delivers cost and time effectiveness and presents opportunities for live engagement, high-quality learning, and more practical knowledge. Many studies have shown that students are found to be more focused on their studies in the institute/university environment. Environment plays a major role in the concentration and focus of the students**.** Though the Online classes during the Covid-19 provided the liberty to students for attending classes from their own space, this also reduced their focus and concentration.

c) In industry, the basic principles of SCM are meaningful and directly applicable. However, the implementation of the same in the classroom environment (online or offline) presents various difficulties. A classroom is not a collection of employees; rather, students may be viewed as customers. One may designate students as the consumers of the services of the organization. The other major difference between a class and a workgroup is the time limit of the former, which in turn engenders low levels of commitment and inter-personal interaction among fellow students. These differences require that each SCM principle be examined from the perspective of the classroom. For example, students as customers pay money to buy a service with which they expect to satisfy their need for learning. Unlike customers of many other services, however, the satisfaction of one's need for learning turns out to be at least as dependent on how hard one works as on the "quality" of instruction "consumed". In graduate classes especially, not only one's learning outcomes but also those of fellow students often depend on how hard each works. The class disciplines also require that students must attend classes and submit assignments at fixed times, be subjected to rewards and penalties based on performance evaluation, and generally do what they are told to do - they begin to look a little like "employees"!

d) The author switched to online teaching without any time to learn the technology, or standard quality online teaching practices. We had many years (more than 30 years!) of experience teaching in-person, and we had developed pedagogy, lessons, and interactive elements around the offline mode of learning. We had very little experience teaching online. Shifting from offline to online mode was a challenge for both students and teachers.

The students' experiences in these online learning environments, which were thrown together at the last minute, are not necessarily indicative of students' experiences in a quality online course based on principles from Quality online education!

e) The students expressed in informal ways that online teaching with a lack of social interaction leads to reduced learning space and lower levels of motivation and well-being. Concerns about lack of face-to-face contact may have been aggravated by the stressful situation due to Covid-19. Face-to-face interactions provide the foundation for social communication, the lack of which can be viewed as a disadvantage of the online mode. Face-to-face interaction may be crucial for students who are expected to have good communication skills while implementing SCM initiatives (these are especially desired for SCM professionals!).

f) The basic strategy in the online environment consisted of transferring a substantial portion of the power of the instructor to the students, allowing them to structure the learning environment and make many decisions concerning the course (choosing teammates, choosing the topic for the mini-project etc.).
Overall, the students were satisfied with the online teaching, although they experienced self-perceived reduced learning outcomes compared to the pre-pandemic situation. It appears that they adapted quickly to the new situation, but they also reported difficulties with the transition to new teaching methods. Based on personal interactions with students, the most important concerns among students were a lack of social interaction, technological challenges such as insufficient data bandwidth, and a sense of reduced motivation and effort. The application of the online pedagogy implies a paradigm shift from the view of students as passive consumers of information to active participants in the achievement of their educational goals through the notion of the empowered customer, especially in an online environment when there are no requirements of attendance!
However, it may be noted that the empowerment of students can result in a much greater burden on the teacher who must be fully prepared to implement any one of the numerous options he/she makes available for the students, especially in the online platform. The teacher must acquire competencies in many different formats for the conduct of classroom activities (from lecture to discussion to managing and processing online group exercises).

g) Shifting from an offline to an online environment required the acquisition of a new skill set for the instructor. The supply chain of the online environment involves extreme close coordination and cooperation of various agents involved- the computer service centre (through which MS Team is administered), Teaching assistants, Proctoring team, departmental service etc. In a physical mode, these agents are somewhat invisible!

We did not collect person-sensitive data, and thus we know little about the students' circumstances. This may be considered as a limitation of the study.

7. Concluding Remarks

a) Online teaching exposed both students and teachers to a set of challenges. Some of these challenges are generic (common to almost all courses) while some could be specific to a course like SCM.
b) During the last more than 2 years, various editions of the SCM course were run. This provided an opportunity to look at the teaching-learning process. A process-based perspective in line with the philosophy of SCM is subscribed while designing and delivering the contents.
c) The process philosophy is built around three basic ideas: become customer-driven instead of being self-focused, concentrate on the processes rather than being preoccupied with results; and use students' thinking ability to enhance the quality of the learning. This assumes more significance in online mode.
d) Various concepts like Continuous Improvement, Customer Focus, and Teamwork are closely related to each other. Continuous improvement is required to achieve higher customer satisfaction (in this case 'student'), and it is most effective when driven by customer needs with empathy in mind. Based on the feedback received from the students, an attempt was made to improve the content design and delivery of the course. Continuous improvement transcends hierarchical, functional, and organizational boundaries; therefore, teamwork is essential. Thus, teaching SCM also involves a set of mutually reinforcing principles, which are ultimately based on fulfilling customers' needs.
e) The underlying educational process is based on learning methodology rather than teaching-based programs. In this process, the virtual classroom is equipped with IT support (MS Teams, Moodle etc.) based on learning and the teacher is acting as a guide for the students. This perspective facilitated students to share knowledge and experience and hence their learning outcomes improved. The learning process can be evaluated using continuous feedback from students.

f) The application of PDCA enabled to make improvements in the prevailing Covid-19 environment. This was necessary in the absence of face-to-face interactions with students.
g) Technology platforms in a smart classroom setting can enhance the teacher student experience when both can see each other creating a virtual class room experience.

We have not only facilitated and coached students in the SCM course but have also applied some of the lessons learned in the course to other courses as well (For example a course on Industrial Engineering systems (for students of the MEE programme), or Statistics for Manufacturing Managers).

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