**Innovation Competence among students in Arts & Science Colleges in Coimbatore city *Dr.R.Swaranalatha, Associate Professor & Head, BBA-RM, PSG College of Arts & Science, Coimbatore***

**ABSRACT**

 Innovation is the buzz word creating ripples in the world of educational sector today. Indian Government has been gearing up all Higher Educational Institutions in creating Institutions’ Innovation Council (IIC) and encouraging innovative skill and entrepreneurial culture among the future leaders of our Nation in schools and colleges. Business Organizations are looking for potential employees with this innate set of skill sets to gain competitive edge and improve their business performance. Higher Educational Institutions has a significant role in creating awareness towards Innovation and nurturing this skill among their students, to make them career ready to face the future job demands of the twenty-first century. This calls for creating innovative pedagogical tools apart from traditional teaching methods to deliver the students effectively. This article is aimed at analyzing the innovative competence of students in the academic learning environment and how satisfied are they with this competency.

**1. Introduction**

All sectors of the economy emphasize the importance of innovations. Business firms and organizations are continuously looking for innovative employees. Companies need innovations to create competitiveness and the public sector needs innovations to produce high-quality and cost-efficient services. As a result, there is an urgent need for future professionals who are capable of participating in innovation processes and who can contribute to the creation of innovations. Innovative individuals are the resource of all innovations and higher education represents a critical factor in human capital department. The role of higher education is not only to educate undergraduates for future work but also to train future employees to perform work tasks, which then generate innovations. Higher educational institutions, regardless of context, are expected to prepare innovative individuals capable of coping with the twenty-first century demands. A renewed EU agenda for higher education institutions ([European Commission, 2017](https://www.emerald.com/insight/content/doi/10.1108/ET-03-2018-0064/full/html#ref016)) not only highlights the unique role of higher education in contributing to innovation but also demands effective and efficient higher education systems.

The Economic growth and social progress of any nation depend increasingly on innovation. Innovation is an idea, practice, or object which is perceived as new by a unit of adoption and carried out into practice (Rogers, 2003). It is defined as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method or a new organizational method” (OECD, 2007, p. 46). Innovation in students is what builds an organization, a nation, and the world. The concept of innovation involves incremental adaptation and gradual adoption in different contexts. Creative learning and pedagogical tools should be implemented by the education system to bring out the innovative mind-set among the students. These tools will bring new ideologies and start-ups in India.

Portuguez *et al*. recognise the valuable role that higher education plays in creating synergies between innovation and entrepreneurship, while Yordanova *et al.*remark that universities are increasingly involved in creating an internal, favourable environment supporting entrepreneurship and innovation. University entrepreneurship programmes aid students’ development of creativity and innovativeness and provide society with more entrepreneurs and innovators. The New Education Policy 2020 introduced in India, created an awareness of creativity and innovation among the students. An initiative undertaken by MHRD’s Institutions Innovation Council, Entrepreneurial Development Cell and establishment of Incubation centres has facilitated the students to understand the need for creativity and innovation in business.

Due to the lack of research that focuses on this topic, this research paper identifies the perception of students towards impact of learning environment in developing innovation competencies and supporting campus ventures in the select Arts and Science College in Coimbatore city.

**1.1. Innovation in education:**

Although education has a central role in developing human innovation skills, several studies suggest that higher education institutions alone cannot fulfil this demand. Educational practices, especially in higher education, have been criticized for failing to develop these prerequisites of professional expertise. Traditional forms of teaching like reading, lecturing and working alone have even shown to be negatively associated with learning the needed competences. It also highlights the importance of evidence-based education.

**1.2 Development of creativity and innovation in higher education:**

Creativity and innovation will be nurtured when individuals feel free from stress, safety and positivity. There are nine qualities that promote creativity (Amabile,1998). They are –

1. Freedom in deciding what to do and how to accomplish the task.

2. Proper project management, which provides a good role model with excellent communication skills, protects the project team from outside distractions and interference.

3. Sufficient resources with access to necessary resources, including facilities, equipment information, and people.

4. Encouragement and being enthusiasm for the new ideas and creating an atmosphere free of threatening evaluation.

5. An environment where innovation is prized and failure is not fatal.

6. Recognition and showing a general sense that creative work will receive appropriate feedback.

7. It provides sufficient time to think creatively about the problem to explore different perspectives rather than impose an already determined approach.

8. A sense of challenge arising from the intriguing nature of the problem itself.

9. The last quality of the environment that influences creativity and innovation is pressure and urgency, which is internally generated from the competition with an outside organization.

This study intends to analyse how learning environment impacts innovative competencies and how far it supports students in initiating campus ventures.

**2. Aim of the study:**

The aim of this paper is to study the innovation competence among students and study whether learning environment build students’ innovation competencies. **Objectives of the study** are:

* To examine the students’ extent and level of their knowledge on innovation.
* To understand student’s perception towards the sources of innovative thinking.
* To analyse students’ opinion if learning environment supports in enhancing the innovative skill among students.
* To identify the factors and skills that influences the innovative competence of students.
* To study the perception of students towards the impact of institutional initiatives in establishing campus start-ups.

**3. Scope of the study:**

* This study will help the students to understand their level of Innovation competence and accordingly plan to groom their innovative skills.
* This study can help the educators to plan suitable training programs to enhance the creative and innovative skills of their students.
* Teaching staff may also use our results to analyse their students’ innovation competencies and decide whether they should take measures to improve them.
* This study can help the policy makers in higher education to design suitable strategies to promote innovative attitude and competencies among student community to build an innovative ecosystem in higher educational Institutions encouraging students to initiate campus ventures.

**4. Review of Literature:**

Villa and Poblete (2007) defines competence as good performance in diverse, authentic contexts based on the integration and activation of knowledge, standards, techniques, procedures, abilities and skills, attitudes and value. Recommendations by the European Qualifications Framework for Lifelong Learning (2008) add the terms ‘responsibility’ and ‘autonomy’ to the meaning of competence, describing it as ‘the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development’. Scholarly research points that the characteristics and behaviour of people in the workplace are at the core of organizational innovation. (Patterson, 2009).

According to Spencer and Spencer (1993), competence always includes an intent, which is the motive or trait that causes action towards an outcome. The learning environment should be organized to support future visioning, facilitate idea generation, and foster the creation of new solutions to authentic problems. It should also allow social interaction in the form of team projects to incorporate project management activities. Ruohotie (2003) defines competence as an individual quality, which causally explains efficiency defined by certain criteria, or success in duties and tasks in work situations. Competence can consist of motivations, characteristics, self-concepts, attitudes, values, knowledge or cognitive and practical skills – any individual qualities, which can be reliably measured and assessed. Innovation competence can be defined as those capabilities, which are needed for a successful innovation (Forsman, 2009).

According to Mathisen, Martinsen and Einarsen (2008), creativity refers to the development of novel and useful ideas and innovation towards the application of ideas. Cerinšek and Dolinšek (2009) inferred that the development of innovation is associated with significant risk and uncertainty. It is hard to predict the progress and results of innovation processes, which can influence self-confidence and motivation. Bjornali and Støren (2012) and Waychal *et al*. (2011) defined innovation as a process of turning opportunity into new ideas and putting them into widely used practice.

**Innovation skills**

It is increasingly acknowledged that future innovators and entrepreneurs will require a large range of skills to be able to meet the demands of the changing economy (OECD, 2010). A larger group of students with broad range of innovative skills will be a great boon to our nation’s start-up community. In addition to innovation and strong subject-based know-how, skills such as critical thinking, design thinking, creativity, problem solving and ability to look at things from broad perspectives will be needed in the students of tomorrow. They will need to work in teams, communicate their messages effectively and adapt to changing circumstances and learn to interact with their environment instead of working in isolation. Transferable skills are crucial for today's students to be prepared for tomorrow's workplace (Barrett and Moore, 2011).

Creative thinking skills are defined as creative competences and cognitive skills. Creativity is a key innovation competency factor in most studies. According to Cerinšek and Dolinšek (2009), creativity is the ability to generate new ideas independent of their possible practicability and future value. Students are expected to be prepared to collaborate in solving future problems and producing innovations in areas that presently do not exist (Sawyer, 2014). Openness to experiences and curiosity are defined as the willingness to confront new situations and the flexibility to experience them (Celik, 2013). Proactiveness is the ability to develop new ideas and take initiative (Cerinšek & Dolinšek, 2009). Coping with chaos and uncertainty reflects an ability to deal with unexpected situations, the flexibility to deal with plans and deadlines and the ability to improvise (Chatenier *et al*., 2010).

Problem solving is defined as a generic skill that is key to innovation and synonymous with the creative process (Edwards-Schachter *et al*., 2015). Cognitive skills are also considered crucial for innovation. According to Treffinger, Young, Selby and Shepardson (2002), cognitive skills refer to convergent or critical thinking ability. Social skills are the core competency in innovation development. Social skills are necessary for interaction and communication with others (Riggio, 1986). Social skills are divided into three sub-categories: collaboration, networking and communication skills.

Collaboration skills were defined as the ability to work productively with others (or in teams (Jack *et al*., 2014). Teamwork skills allow otherwise dispersed local knowledge to be combined, which allows innovative capabilities to be improved (Wang and Shuai, 2013). Networking skills refer to the ability to develop, maintain and use networks effectively to forge beneficial alliances and coalitions that are critical to innovation (Avvisati *et al*., 2013)

Social astuteness is defined as a person’s ability to understand social situations and interpersonal interactions, and to remain sensitive to the motivations and responsibilities of different parties. It involves expressing empathy (Chatenier *et al*., 2010). Brokering skills are defined as information exchange skills in which participating people link information and knowledge from various internal and external sources, which leads to new opportunities (Bjornali & Støren, 2012). This article is aimed at understanding the innovative competence of students and helps to understand how the learning environment in the higher educational environment has supported the students to develop this competency. It also attempts to understand the student’s perception of how innovative competency has supported them to initiate campus start-ups within the educational institution.

This leads us to pose the following research questions:

RQ1: How do students perceive their own innovation competencies?

RQ2: What innovation competencies are best achieved by students?

RQ3: What is the level of satisfaction with regard to Institutional initiatives and services in supporting the initiation of campus start-up ventures?

**5. Research Methodology:**

**Descriptive research design** is used in this study. **Simple random sampling** technique is used for the present study to identify the sample respondents. The s**ample size of the present study is** 250 students from Arts and Science College in Coimbatore district. Data is collected through primary and secondary sources. In primary data, it is done through Google form that includes data about their demographic profile and study related parameters to judge their perception towards innovation competence, its triggering factors, skills required and different components of innovation. Secondary data was collected to support this study from various websites and journals. The tools used for data collection is Questionnaire through Google forms to test Innovation competence of students and simple percentage analysis is used for analysing the data in the present study.

**6. Results and discussions:**

**Table: 6.1 - Profile of the respondents**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Category** | **Respondents** | **Percentage Analysis (%)** |
| **Gender** | Male | 178 | 71.2 |
| Female | 72 | 28.8 |
| **Age** | Below 20 years | 62 | 24.8 |
| 20-29 years | 188 | 75.2 |
| Above 30 years | NIL | NIL |
| **Educational Level of the respondents**  | Under graduate | 174 | 69.6 |
| Post graduate | 72 | 28.8 |
| Ph.D., | 4 | 1.6 |

From the above table we can understand that 28.8% of the respondents are female and 71.2% of them are male. Female students display more risk aversion than their male counterparts, yet they exhibit problem-solving skills, decision-making, creativity, communication, and networking which are conducive to innovation but of low stature than the male students. 24.8% are below 20 years while 75.2% of them are from 20-29 years.69.6% of the respondents are Undergraduates, 28.8% of the respondents are Postgraduates and 1.6% of our respondents are Ph.D. research scholars.

**Table –6.2 - Student’s perception towards Innovation**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Meaning of the term – Innovation** | **No. of Respondents** | **Percentage Analysis (%)** |
| 1 | Creating new idea | 57 | 22.8 |
| 2 | Implementing new idea | 46 | 18.4 |
| 3 | Doing Something different | 24 | 9.6 |
| 4 | All of the above | 123 | 49.2 |

 From the above table, we can understand that out of 250 responses, 49.2% of respondents reported innovation means creating new idea, implementing new idea, doing something different, 22.8% of the respondents reported innovation means creating new idea and 18.4% of the respondents reported innovation means implementing new idea and 9.6% of the respondents reported innovation means doing something different.

**Table–6.3: Student’s opinion towards sourcing opportunities for Innovation**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Category** | **No. of respondents** | **Percentage Analysis****(%)** |
| 1 | Market analysis from Customers, Competitors and other stakeholders  | 69 | 27.6 |
| 2 | Observation from Pain points of Users by the employees of the business firm | 35 | 14 |
| 3 | Research& Development Institutions | 42 | 16.8 |
| 4 | Technological advancements | 81 | 32.4 |
| 5 | Others like self-driven interest | 23 | 9.2 |
|  | Total | 250 | 100 |

 Table 7.3 reveals that 32.4% of the respondents opined that technological advancements led to innovation, 27.6% of them felt that innovation generates from Market analysis based on the feedback from Customers, customers and other stakeholders, 16.8% of them opined that innovation stemmed from R& D Institutions, 14 % of them believed that innovation cropped out from observing the pain points of Users by the employees of the firm, while others reported that innovation might have been developed out of the self-driven interest of the individuals.

**Table – 6.4 -Importance of innovation among the students**.

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Category** | **No., of Respondents** | **Percentage****(%)** |
| 1 | Helps in discovering new opportunity and technology | 52 | 20.8 |
| 2 | Helps in developing new ideas leading to new products and services | 73 | 29.2 |
| 3 | Involves different way of looking at problems and solving them with “Out-of-box thinking” | 125 | 50 |

 From the above table we can understand that out of 250 responses, 50% of the respondents reported that Innovation helps in problem-solving using out of box thinking, 29.2% of the respondents that it helps to introduce innovative new ideas and technical developments while 20.8% of the respondents opined that it helps in discovering new opportunities leading to the development of new products and services.

**Table – 6.5 - Support of learning environment in the college to develop innovative skills**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Category** | **No., of Respondents** | **Percentage****(%)** |
| 1 | Strongly agree that learning environment in colleges facilitate to develop innovations | 56 | 22.4% |
| 2 | Agree | 79 | 31.6% |
| 3 | Neutral | 100 | 40% |
| 4 | Strongly disagree | 8 | 3.2% |
| 5 | Disagree | 7 | 2.8% |

From the above table we can understand that out of 250 responses, 40% of the respondents neither agree nor disagree that learning environment supports innovation, 31.6% of the respondents agree that learning environment supports innovation while 22.4% of the respondents strongly agree that learning environment in the colleges supports in the development of innovations.

**Table – 6.6 : Student’s perception towards innovation in Education**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No.** | **Parameters**  | **Category** | **No., of Respondents** | **Percentage****(%)** |
| **1** | **Innovation in Education is developed through------.** | Seeking knowledge from Listening to experts | 56 | 22.4 |
| Reading books | 30 | 12 |
| Observing others in the environment | 36 | 14.4 |
| All the above | 128 | **51.2** |
| Total | 250 | 100 |
| **2** | **New Innovative learning technique adopted in education**  | Competency based learning strategies like role play, debates, Management games, Presentations, etc. | 25 | 10 |
| Flipped classrooms | 40 | 16 |
| Digital learning | 65 | 26 |
| Peer learning | 16 | 6.4 |
| All of the above | 104 | **41.6** |
| Total | 250 | 100 |
| **3** | **Changes needed in Present Educational****Sector** | The government has to take the baton in their hands | 59 | 23.6 |
| Eradicate Rote learning from the HEI at all the levels. | 110 | **44** |
| HEI must be encouraged to introduce conceptual learning and design thinking | 81 | 32.4 |
| Total | 250 | 100 |
| **4** | **Skill required for innovation** | Curiosity mindset | 38 | 15.2 |
| Critical and Creative thinking skills | 120 | 48 |
| Risk taking attitude to do things differently | 50 | 20 |
| Collaboration with others and pooling new knowledge | 17 | 6.8 |
| Others like problem solving skills, etc. | 25 | 10 |
| Total | 250 | 100 |
| 5 | **Innovations promoted through Institutional initiatives through EDC** | Institution’s Innovation cell @PSGCAS | 45 | 18 |
| Incubation Centres | 2 | 0.8 |
| E- Cells and Innovation clubs | 34 | 13.6 |
| Guest Lecture Programmes | 46 | 18.4 |
| Workshops on Design thinking | 25 | 10 |
| Conferences | 4 | 1.6 |
| Training and development | 27 | 10.8 |
| Ideathons, Hackathons and other business-related competitions and events | 67 | 26.8 |

 From the above table we can understand that 51.2% of the respondents opined that innovation in education is developed through Seeking knowledge from Listening to experts, reading books and observing others in the environment. 48% of the respondents reported that competency-based learning, flipped classrooms, digital learning are the new innovative learning techniques followed in education. 44% of the respondents opined that Rote learning (memorising) must be eradicated from colleges.

48% of the respondents opined that creativity triggers innovation, 20% of them opined risk taking mindset to do things differently triggers innovation, 15.2% of the respondents opined that curiosity triggers innovation, 6.8% of the respondents opined collaboration with others and pooling new knowledge as required for innovation while 10% opined problem solving skills for innovation process.

With response to the students opinion towards Innovations promoted through Institutional initiatives through EDC, 26.8% of them strongly agreed that participating in Ideathons, Hackathons and other business-related competitions and events encouraged them to be creative and innovative in generating new business ideas and opportunities.

**Table – 6.7-Perception of students towards the impact of institutional initiatives in establishing campus start-ups**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** | **Statements** | **Agree** | **%** | **Neutral** | **%** | **Disagree** | **%** |
| 1 | I am confident that the institutional efforts support in building innovation competencies among student community leading to the initiation of start-up firms within the campus. | 162 | 64.8 | 76 | 30.4 | 12 | 4.8 |
| 2 | I strongly believe that mentorship can support the student community towards initiating start-ups within the campus | 185 | 74 | 61 | 24.4 | 4 | 1.6 |
| 3 | Institutional infrastructure is very important for developing campus ventures within the institution | 197 | 78.8 | 51 | 31.5 | 2 | 0.8 |
| 4 | Innovative mindset and entrepreneurial ecosystem are essential for initiating campus ventures by the student community. | 189 | 75.6 | 54 | 21.6 | 7 | 2.8 |

It has been observed that 64.8% of the respondents are confident that institutional efforts support in building innovation competencies among student community leading to the initiation of start-up firms within the campus.

74% of the students strongly believe that mentorship can support the student community towards initiating start-ups within the campus.

78.8% of the students opine that Institutional infrastructure is very important for developing campus ventures within the institution.

75.6% of them respond that Innovative mindset and entrepreneurial ecosystem are essential for initiating campus ventures by the student community.

**Table – 6.8: Satisfaction level towards support ecosystem for campus start-up ventures.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Facilities and Services Provided**  | **Mean** | **S.D.** | **t.** | **Sig.,**  |
| Pre-incubation and Incubation facilities | 4.18 | **0.08** | **13.132** | **0.000** |
| Facilitate funding support through IVP  | **4.10** | **0.99** | **9.839** | **0.000** |
| Legal, administrative, marketing and technical support | **3.88** | **1.15** | **5.756** | **0.000** |
| Research labs and infrastructural facilities  | **3.50** | **3.50** | **1.14** | **2.403** |
| Provide linkages between technical institutes and successful entrepreneurs | **3.49** | **1.17** | **2.607** | **0.013** |
| Quality of faculty mentors | **3.75** | **1.08** | **6.148** | **0.000** |
| Workshops, seminars, investor pitches, Ideathons, Hackathons and events organised by EDC | **3.56** | **1.12** | **4.428** | **0.000** |

From the above table it can be noted that the students are highly satisfied towards the various services and facilities provided by the institutions as the mean value for all variables are above 3. One sample t-test is used to assess whether the mean significantly deviates from the mean of the response scale, namely 3. Since the significance level of one sample t-test is less than 0.05 and mean value greater than 3 for all the variables, it is assumed that students have significantly high level of towards the services and facilities provided by their institutions.

**8. Discussion**

1. Majority of the respondents in the above study are female and are above 20 years of age. Majority of the respondents are undergraduate hailing from semi-urban area.

2. 61.2% of respondents reported innovation means creating new idea, implementing new idea, doing something different.

3. 32.4% of the respondents opined that technological advancements led to innovation.

4. 27.6% of them felt that innovation generates from Market analysis based on the feedback from Customers, customers and other stakeholders.

5.16.8% of them opined that innovation stemmed from R& D Institutions

6. 14 % of them believed that innovation cropped out from observing the pain points of Users by the employees of the firm.

7. 9.1% reported that innovation might have been developed out of the self-driven interest of the individuals.

8. 50% of the respondents reported that Innovation helps in problem-solving using out of box thinking.

9. 29.2% of the respondents that it helps to introduce innovative new ideas and technical developments.

10. 50% of the respondents reported that Innovation helps in problem-solving using out of box thinking.

11. 29.2% of the respondents that it helps to introduce innovative new ideas and technical developments.

12. 20.8% of the respondents opined that it helps in discovering new opportunities leading to the development of new products and services.

13. 22.4% of the respondents strongly agree that learning environment supports innovation among students in colleges.

14. 51.2% of the respondents opined that innovation in education is developed through Seeking knowledge from Listening to experts, reading books and observing others in the environment. 15. 48% of the respondents reported that competency-based learning, flipped classrooms, digital learning are the new innovative learning techniques followed in education.

16.44% of the respondents opined that Rote learning (memorising) must be eradicated from colleges.

17. 48% of the respondents opined that creative mindset triggers innovation among students.

18. 26.8% of them strongly agreed that participating in Ideathons, Hackathons and other business-related competitions and events encouraged them to be creative and innovative in generating new business ideas and opportunities.

19.64.8% of the respondents are confident that institutional efforts support in building innovation competencies among student community leading to the initiation of start-up firms within the campus.

20. 74% of the students strongly believe that mentorship can support the student community towards initiating start-ups within the campus.

21. 78.8% of the students opine that Institutional infrastructure is very important for developing campus ventures within the institution.

22. 75.6% of them respond that Innovative mindset and entrepreneurial ecosystem are essential for initiating campus ventures by the student community.

**9. Suggestions:**

* Faculty members must be driven towards adopting innovative teaching learning pedagogy like Flipped classroom, Peer learning, Activity based learning and experiential learning techniques.
* Students must be appreciated for out-of-box thinking and encouraged to do things differently in the curricuklar, co-curricular and extra-curricular activities in their colleges.
* Students must be encouraged to organise and attend competitions like Ideathons and Hackathons to generate innovative ideas for solving problems tactfully.
* Efforts must be focussed by the colleges to organise Design thinking workshops to kindle the observation skills, problem solving and innovative skills of students.
* HEI should build confidence among faculty and students and create suitable ecosystem for them to initiate campus ventures.

**10. Conclusion:**

Generally speaking, the main purpose of innovation is to improve people’s lives. When it comes to managing a business, innovation is the key for making any kind of progress. Small improvements eventually lead to bigger and better ideas that may one day become revolutionary. Likewise, if Higher Educational Institutions (HEI) encourage innovation among student community through introduction of innovative teaching-learning pedagogy, it is inherently possible to create a student pool that is creative and innovative enough to contribute their might in leading a change in our Nation.

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