Teaching Competencies of Newly Recruited Faculty of Agricultural Universities
An Analysis[†]

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Abstract

This paper explores perceived knowledge and relevance of teaching competencies and determined teaching needs of newly recruited agricultural university faculty. The aim is to develop the content for initiating capacity-building programmes. Previously developed instrument with modifications is used to determine 20 teaching competencies by examining 204 newly recruited faculties of 19 Agricultural Universities representing Agricultural Sciences, Veterinary Science, Home Science, Horticulture, Fishery Science, Sericulture, Engineering, etc. Mean weighted discrepancy scores calculated to determine the teaching needs. The greatest teaching needs identified were 'getting students engaged in learning', 'undergraduate advising', 'teaching in practical settings', 'using web-based technologies for managing courses' and 'effective teaching fundamentals'. Certain teaching competencies viz. 'learning styles of students and faculty', 'distance education basics' and 'undergraduate advising' significantly varied among newly recruited faculty (teachers and scientists). 'Active learning strategies' across Universities and 'learning styles of students and faculty', 'teaching in practical settings' and 'better teaching through better testing' significantly varied among faculties of agriculture. Gender has no influence on any of the teaching competencies. The identified and prioritised teaching competencies provide the content and direction for development of capacity development programmes for the newly recruited faculty. It suggests periodic Competency Need Assessment (CNA) of faculty at all levels — young, mid-career and senior — and develop programmes for quality agricultural education.

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Introduction

Quality education in Agriculture stems from the teaching competency of the faculty which is the core driver, apart from the other factors of enabling environment *viz.* institutional environment, guiding philosophy, value of institutional commitment, effective quality initiatives, assessment processes, mechanisms and practices of dissemination. Teaching staff need competencies to innovate and adapt; this includes having critical, evidence-based attitudes, enabling them to respond to students' outcomes, new evidences from inside and outside the classroom and professional dialogues, in order to adapt their own practices (European Commission Report, 2013).

Measuring teaching quality is also challenging, which is influenced by the method of recruitment, experience in the field and career development with a clearly defined advancement, etc. Duta, Panisoara and Panisoara (2014) emphasised that the teaching profession requires a prior initial training, not only in terms of the formation of specialised professional and psycho-pedagogical competencies but also in relation to the awareness of particular responsibilities involved by youth training, while vocational guidance has to come in line with one's own professional development needs, with a set of skills designed properly for teaching profession. The agricultural graduates are required to possess professional capabilities to deal with the concerns of sustainable development (productive, profitable and stable) of agriculture in all its aspects. Agriculture education should address the stakeholders' expectations especially for utilitarian mode. Quality and relevance of higher agricultural education is the need of hour to facilitate and undertake human capacity-building for developing self-motivated professionals and entrepreneurs. Contextual understanding of teaching competencies in terms of cognitive domain, skills, attitude–values helps in designing better capacity-building programmes Also, high academic performance of the faculty does not ensure the pedagogical skills of the faculty. The present study was postulated with the following objectives.

Objectives

- To identify the knowledge and relevance levels of selected competencies of newly recruited faculty in Agricultural Universities (AUs).
- To compare knowledge and relevance levels of selected teaching competencies to determine teaching needs of AUs' faculty.
- To find out differences among faculty in teaching competencies.

Background of Agricultural Education in India

The Indian Council of Agricultural Research (ICAR) coordinates, guides and manages research, education and extension services in agriculture, including crops, horticulture,

agroforestry, fisheries and animal sciences. The major objective of ICAR is to plan, undertake, aid, promote and coordinate education, research and its application. Planning, development, coordination and quality assurance in higher agricultural education in the country is taken care of by the ICAR. It strives for maintaining and upgrading quality and relevance of higher agricultural education through partnership and efforts of ICAR–Agricultural Universities (AUs) System comprising State Agricultural Universities (SAUs), Deemed to be Universities (DUs), Central Agricultural University (CAU) and Central Universities (CUs) with Agriculture faculty. Veterinary Council of India (VCI) regulates veterinary practice including Veterinary Education through State Agricultural Universities/Veterinary Universities, which are established through the Legislative Act of the respective State with major financial support from them leading to administrative and policy controls. The ICAR continues to provide professional and partial financial support to them for enhancing the quality, relevance and access of higher agricultural education. With about 265 constituent colleges having about 35,000 student intake capacity, the AUs impart education in 11 major disciplines at undergraduate and about 95 subjects at post-graduate level (NAEP Draft Document, 2012).

Competency of the Faculty

Recruitment of faculty in Agricultural Universities is through a national advertisement. Research accomplishments, academic excellence and interview performance are the criteria for selection of faculty. Qualification in National Eligibility Test (NET) in a specific discipline is a prerequisite. The institutional mechanism to develop and/or test teaching competency of the young faculty of Agricultural Education before recruitment is non-existent. Also teaching and learning support—pedagogy enhancement programmes and continuing education programmes provided for senior faculty is quite minimal.

METHODOLOGY

A descriptive design was used to analyse the teaching competencies of newly recruited faculty of Agricultural Universities. The newly recruited faculty of 19 Agricultural Universities *viz.* Acharya NG Ranga Agricultural University, Govind Ballabh Pant University of Agriculture and Technology, Indira Gandhi Krishi Vishwavidyalaya, Junagadh Agricultural University, Karnataka Veterinary, Animal and Fisheries Sciences University, Punjab Agricultural University, Professor Jayashankar Telangana State Agricultural University, Sri PV Narasimha Rao Telangana State University of Veterinary, Animal and Fisheries, Sardar Vallabhbhai Patel University of Agriculture and Technology, Sri

Venkateswara Veterinary University, Tamil Nadu Veterinary & Animal Sciences University, Tamil Nadu Fisheries University, Tamil Nadu Agricultural University, University of Agricultural and Horticultural Sciences, Shimoga, University of Agricultural Sciences, Bangalore, University of Agricultural Sciences, Dharwad, University of Agricultural Sciences, Raichur, Uttar Banga Krishi Vishwavidyalaya and University of Horticultural Sciences, Bagalkot were considered as sample. About 204 respondents represented Agricultural Sciences, Veterinary Science, Home Science, Horticulture, Fishery Science, Sericulture, Engineering and other branches. All these participants attended training programmes organised by the Academy during the last one and a half years.

Tools Used

The Borich (1980) model of needs assessment was used to measure participants' perception of 20 teaching competencies through a survey instrument developed for the purpose. Participants used a five-point scale (1 = low knowledge/ relevance; 5 = high knowledge/ relevance) to rate their current knowledge for each competency and the degree to which the competency was or wasn't relevant to their job. Earlier research studies supported the Borich Model to study the teaching competencies. This study had the limitation of self-reported levels of knowledge and relevance. The teaching competencies, i.e., 23

identified by Harder et al. (2009) were used. A pre-test was conducted among 40 newly recruited faculty and based on the response pattern, 20 competencies were finalised in the survey instrument. The data were collected through personal survey of respondents who attended orientation programmes for faculty of Agricultural Universities at ICAR— National Academy of Agricultural Research Management, Hyderabad from November 2014 to May 2015.

The sample composed of young Assistant Professors (engaged in teaching graduate, post-graduate and doctoral courses), Scientists (engaged in domain-specific research) and Subject Matter Specialists (engaged in extension activities and transfer of technology). Data were analysed using descriptive statistics and the ranking procedure described by Edwards and Briers (1999). A discrepancy score was obtained for each participant by subtracting perceived levels of knowledge from perceived level of relevance for a specific teaching competency. Each discrepancy score was multiplied by the mean relevance level of that competency, resulting in a weighted discrepancy score for each participant. The weighted discrepancy score was summed and divided by total number to arrive at Mean Weighted Discrepancy Score (MWDS) for each competency. Using this procedure, mean weighted discrepancy scores could range from 20 to –20. Positive scores indicate a need for professional development.

The mean weighted discrepancy scores for all the competencies were ranked to determine the priorities of faculty development needs of Agricultural Universities. Further, the data were subjected to ANOVA (Analysis of Variance) to identify significant factors influencing the teaching competencies.

RESULTS AND DISCUSSION

The results of the first objective, i.e., identification of knowledge and relevance levels of selected competencies of newly recruited faculty of Agricultural Universities and the findings are presented in Table 1.

The faculty of the AUs were most knowledge able about 'Clarity in teaching' (M=4.172, SD=0.857), 'Effective teaching fundamentals' (M=4.010, SD=0.993), 'Teaching in practical settings' (M=4.044, SD=0.984), 'Creating the perfect course syllabus' (M=4.000, SD=1.032) and least knowledge able about 'Distance

Table 1
Competency Ratings: Perceived Levels of Knowledge and Relevance of AU Faculty

S. No.	Competency	Knowledge (n=204)		Relevance (n=204)	
		Mean (M)	Standard Deviation (SD)	Mean (M)	Standard Deviation (SD)
1.	Effective lecturing	3.995	0.878	4.078	1.039
2.	Clarity in teaching	4.172	0.857	4.152	1.061
3.	Teaching critical thinking	3.436	1.079	3.431	1.256
4.	Creating the perfect course syllabus	4.000	1.032	3.868	1.198
5.	Using student evaluations/ performance to improve teacing	3.946	0.979	4.015	1.034
6.	Using technology in teaching	3.922	1.043	3.975	1.107
7.	Questioning techniques	3.701	1.048	3.657	1.203
8.	Effective teaching fundamentals	4.010	0.993	4.108	1.059
9.	Peer evaluation	3.417	1.166	3.461	1.261
10.	Teaching & Learning styles	3.520	1.121	3.544	1.253
11.	Active learning strategies	3.755	1.182	3.848	1.279
12.	Getting students engaged in learning	3.877	1.027	4.108	1.144
13.	Teaching in practical settings	4.044	0.984	4.142	1.112
14.	Using web-based technologies for managing courses	3.353	1.176	3.471	1.213

15.	Better teaching through better testing (teacher evaluation)	3.632	1.010	3.672	1.125
16.	Cooperative learning	3.603	0.995	3.681	1.102
17.	Teaching large classes	3.294	1.146	3.137	1.208
18.	Distance education basics	2.627	1.153	2.559	1.183
19.	Undergraduate advising	3.735	1.1780	3.848	1.224
20.	Post Graduate advising	3.270	1.4249	3.255	1.480

education basics' (M=2.627, SD= 1.153). Well-structured, uniform curriculum and grading system as stipulated by the Indian Council of Agricultural Research (in case of Agriculture & other sciences) and Veterinary Council of India (in case of Veterinary Sciences) is followed uniformly in all universities so respondents were well-informed about the course content, course outlines, etc. The selected sample were either postgraduates or doctorates in their respective domain knowledge and were aware of importance of teaching in practical settings and fundamental aspects of teaching. Harder et al. (2009) also brought out that faculty of the College of Agricultural and Life Sciences (CALS), University of Florida, themselves had highest levels of knowledge of effective lecturing, clarity in teaching, graduate advising, teaching critical thinking and creating perfect course syllabus.

AU faculty perceived six competencies as highly relevant and the remaining competencies as moderately relevant. Highly relevant competencies were 'Clarity in teaching' (M=4.152, SD=1.0605), 'Teaching in practical settings' (M=4.142, SD=1.1112), 'Effective teaching fundamentals' (M=4.108, SD=1.059), 'Getting students engaged in learning' (M=4.108, SD=1.059), 'Effective lecturing' (M=4.078, SD=1.039) and 'Using student evaluations to improve teaching' (M=4.015, SD=1.034), and 'Distance education basics' (M=2.559, SD=1.183) was perceived to be the least relevant competency. Agricultural and Veterinary Education aims to prepare students for professional career and develop skills to meet the needs of farming community and hence the above competencies are most relevant for faculty. The most relevant competencies focus on fundamentals of teaching-learning, teaching methodologies and active students engaged in learning methodologies. AU faculty had low knowledge and relevance in 'Distance education' basics as very few faculties were involved in Distance education courses offered by limited AUs.

Mean weighted discrepancy scores (MWDS) were calculated for each of the competencies for the second objective. A positive MWDS indicates that training is needed, while a negative MWDS indicates that no training is necessary (Table 2). The range of possible MWDS scores was –20 to 20.

Positive MWDS scores were obtained for 13 teaching competencies and highest MWDS were for 'Getting students engaged in learning' (MWDS=0.894) followed by 'Undergraduate advising' (MWDS=0.422) and 'Teaching in practical settings' (MWDS = 0.396). The three competencies with negative MWDS were 'Creating the perfect course syllabus' (MWDS= –0.529), 'Teaching large classes' (MWDS = –0.516) and 'Distance education basics' (MWDS = 0.180). Harder et al. (2009) indicated that the competency 'Getting students engaged in learning' received highest priority in a study conducted among the faculty of College of Agriculture and Life Sciences at University of Florida.

Table 2
MWDS for Teaching Competencies of AU Faculty

S.No.	Competency	MWDS (n=204)	Rank
1.	Getting students engaged in learning	0.894	1
2.	Undergraduate advising	0.422	2
3.	Teaching in practical settings	0.396	3
4.	Using web-based technologies for managing courses	0.394	4
5.	Effective teaching fundamentals	0.393	5
6.	Active learning strategies	0.349	6
7.	Effective lecturing	0.333	7
8.	Cooperative learning	0.282	8
9.	Using student evaluations/performance to improve teaching	0.271	9
10.	Using technology in teaching	0.211	10
11.	Peer evaluation	0.151	11
12.	Better teaching through better testing (teacher evaluation)	0.142	12
13.	Teaching & Learning styles	0.086	13
14.	Teaching critical thinking	0.017	14
15.	Post Graduate advising	0.048	15
16.	Clarity in teaching	0.082	16
17.	Questioning techniques	0.163	17
18.	Distance education basics	0.180	18
19.	Teaching large classes	0.516	19
20.	Creating the perfect course syllabus	0.529	20

High credit load, e.g., 166 in Bachelor of Science (Agriculture) (4 years' duration), 177 in Bachelor of Veterinary Science and Animal Husbandry (5 years' duration), shortage of manpower and lack of knowledge about student-centered teaching methods were the primary reasons for following teacher-centric teaching methods, but realised the need for student-centric teaching methods and hence rated the competency 'Getting students engaged in learning' as highly relevant. Wardlow and Johnson (1999) also found that faculty considered themselves 'good to excellent' in traditional teaching methods such as lecture, demonstration, preparing teaching materials and motivating students.

Agricultural University faculty act as Student Advisors and mentor the students for academic excellence on campus and hence 'Undergraduate advising' was ranked high. About 39 per cent to 43 per cent of credit load in agriculture and allied courses are devoted to practical classes and hence respondents gave high rating to the competency of 'Teaching in practical settings'. Duta et al. (2014) characterised the university teachers on eight competencies *viz.* scientific competence, teaching competence, transversal competence, relational competence, vocational and dedication, experience in educational institutions, self-assessment and professional development and research. Romanian subjects ranked high on transversal competencies (e.g., capacity of

information use, analysis and synthesis, interdisciplinary linking of knowledge, solving the problems arising in teaching room, teamwork, critical thinking) while subjects from Spain ranked high on teaching competencies (e.g., know-how to teach, have a solid pedagogical training, psycho-pedagogical skills, good communicator, interactive thinking, etc.). Zhu et al. (2013) indicated that teachers' educational competency, social competency and technological competency were positively related to their innovative teaching performance.

The third objective was to find out differences among faculty in teaching competencies. Significantly differing teaching competencies across the cadre/designation/position, universities, faculty and gender are presented in Table 3.

The teaching competencies *viz.* learning styles of students and faculty, distance education basics and undergraduate advising were significantly varying ($p \leq 0.01$) among the different cadres, i.e., Assistant Professors, Scientists and Subject Matters Specialists.

Active learning strategies across universities ($p \leq 0.05$) and learning styles of students & faculty, teaching in practical settings and better teaching through better testing were significantly ($p \leq 0.05$) varying among different faculties of agriculture. Newly recruited faculty have a trinity of functions *viz.* Teaching, Research and Extension as all Agricultural Universities were established following

Table 3
Differences between Competencies across Different Parameters

S. No.	Competency	Cadre (n=204)		Universities (n=204)		Faculty (n=204)		Gender (n=204)	
		F	Sig.	F	Sig.	F	Sig.	F	Sig.
1.	Effective lecturing	0.588	0.557	0.512	0.932	0.983	0.445	1.629	0.203
2.	Clarity in teaching	0.879	0.417	0.496	0.941	0.141	0.995	1.020	0.314
3.	Teaching critical thinking	0.905	0.406	0.554	0.906	0.461	0.862	2.923	0.089
4.	Creating the perfect course syllabus	0.041	0.960	1.211	0.266	1.338	0.234	0.938	0.334
5.	Using student evaluations/ performance to improve teaching	0.935	0.394	0.915	0.549	0.612	0.745	0.069	0.793
6.	Using technology in teaching	1.031	0.359	1.660	0.062	0.766	0.616	0.521	0.471
7.	Questioning techniques	1.750	0.176	0.701	0.782	1.139	0.340	1.353	0.246
8.	Effective teaching fundamentals	0.057	0.945	0.930	0.532	1.269	0.268	0.002	0.969
9.	Peer evaluation	0.173	0.841	1.151	0.314	1.130	0.346	1.232	0.268
10.	Teaching & Learning styles	4.571	0.011**	0.465	0.955	2.098	0.045*	0.483	0.488
11.	Active learning strategies	1.141	0.322	1.741	0.046*	1.483	0.175	1.731	0.190
12.	Getting students engaged in learning	0.581	0.561	0.940	0.521	0.991	0.439	0.390	0.533
13.	Teaching in practical settings	0.572	0.565	1.026	0.430	2.053	0.050*	0.232	0.630
14.	Using web-based technologies for managing courses	1.124	0.327	0.858	0.612	1.905	0.071	0.003	0.958
15.	Better teaching through better testing (teacher evaluation)	0.128	0.880	1.677	0.058	2.258	0.031*	2.012	0.158
16.	Cooperative learning	0.785	0.458	1.324	0.191	0.912	0.498	1.381	0.241
17.	Teaching large classes	0.358	0.699	1.617	0.072	1.593	0.139	0.243	0.623
18.	Distance education basics	4.915	0.008**	0.494	0.942	1.286	0.259	1.350	0.247
19.	Undergraduate advising	5.883	0.003**	0.637	0.842	1.931	0.067	0.015	0.903
20.	Post Graduate advising	0.968	0.381	0.860	0.610	0.983	0.445	1.629	0.203

Notes: * Significant at 5% level
** Significant at 1% level

Land Grant Pattern of USA and all faculty need to be equipped with relevant competencies to carry out these three functions. Empirical evidence suggested that most of the professional course students were Accommodators (Doer) as against Divergers (Watcher) and Assimilators (Thinkers) in academic course, and students' learning style and academic performance were significantly related (Tripathi and Sethi, 2014). The course content in Veterinary Sciences nurtures more 'Accommodators' than Agricultural Sciences. However, gender has no influence on any of the teaching competencies.

Nature of the course content, instructional designs, teaching and learning methodologies, duration of the course, complexity of the subject, etc., lead to the differences in the competencies of faculty. Varied academic excellence as reflected in teaching and learning styles was also observed among the faculty. The results point out that gender has no influence on the teaching competencies as all are exposed to the same content and methods as stipulated by either ICAR/VCI.

CONCLUSION

Getting students engaged in learning, undergraduate advising, teaching in practical settings, using web-based technologies for managing courses, effective teaching fundamentals, active learning strategies, effective lecturing, cooperative learning, using student evaluations/performance to improve teaching, using technology in teaching, peer evaluation, better teaching through better testing (teacher evaluation), teaching and learning styles, etc., were the core competencies required for newly recruited faculty of agricultural universities which should form the basis for content development in capacity-building programmes. Quality agricultural education reflect on the institutional quality teaching initiatives mainly targeting newly recruited faculty and part-time teachers and continuing education for senior faculty and support to teaching and learning environment by institutions produce quality graduates. Periodic competency need assessment (CNA) of faculty cutting across all levels— young, mid-career and senior faculty— with appropriate initiatives result in quality enhancement of agricultural education.

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