KIET Group of Institutions, Delhi-NCR, Ghaziabad

(An ISO – 9001: 2008 Certified & 'A' Grade accredited Institution by NAAC)

Office of the Dean R&D

Policy for Research Guidance/ Ph.D. Guidance for Improving Research Culture

Issued By

25.08.2021

Dr Sanjay Sharma
Dean (R&D)

Approved By

25 Aug 2021

Dr A Garg
Director

Index

Office of the Dean R&D

Policy for Research Guidance/ Ph.D. Guidance for Improving Research Culture

The main purpose of research is to inform action, to prove a theory, and contribute to developing knowledge in a field or study. In academia, research is the source of new discoveries, whether they are funded by government grants or by business. Also, teaching in the university sector is informed by research (known as the scholarship of teaching). Without such research, it would be almost impossible to improve teaching. Research means to carefully analyze the problems or to do the detailed study of the specific problems, by making use of special scientific methods. Thus, the study should seek to contextualize its findings within the larger body of research. Research must always be of high quality in order to produce knowledge that is applicable outside of the research setting. Furthermore, the results of any study may have implications for policy and future project implementation.

A.1 Requirements for Faculty Career Advancement in KIET based upon Research Guidance Policy w.e.f. 01st Sept, 2022

S. No	Category of Promotion	Existing Faculty Members	Direct Recruitment (Newly Joining faculty Members)
1	AP-1 Level to AP-2 Level and AP-2 Level to AP-3 Level	Ph.D. (Registration) is mandatory for Promotion of Assistant Professor from AP-1 Level to AP-2 Level and also AP-2 Level to AP-3 Level.	Newly joining faculty members at AP-2 and AP-3 Level are required to register in the Ph.D Program at the earliest for confirmation of their appointment subject to fulfilling other terms of probation.
2	AP-3 Level to Associate Professor	For Promotion from AP-3 Level to Associate Professor, faculty members are required to have the following- • Ph.D. Degree in the relevant field • One ongoing Ph.D Guidance is desirable	For direct recruitment for the post of Associate Professor, candidates are required to have the following- • Ph.D. Degree in the relevant field • One ongoing Ph.D Guidance is desirable
3	Associate Professor to Professor	Ph.D. Degree in the relevant field and at least two ongoing Ph.D guidance as supervisor/Co-supervisor are required for Promotion from Associate Professor to Professor.	Newly joining faculty members at the post of Professor (if not having two ongoing Ph.D Scholar at the time of joining) are required to get atleast two Ph.D Research Scholar registered with reputed University within one year of joining the Institute for the confirmation of appointment subject to fulfilling other terms of probation.

A.2 Details of Ph.D Benefits

S.No	Category	Ph.D Benefits	Requirements/Conditions
1.	Ph.D (Part Time) Fee Reimbursement	On acquisition of the Ph.D. from Institutes/Universities of repute (IISc Bangalore, IITs, JNU, NITs, IIITs and Central Universities of repute), a faculty may avail Ph.D. tuition fee reimbursement on an actual basis but not exceeding Rs. 30,000/- per year (on prorate basis with salary) for three years after fulfilling conditions as mentioned.	• Faculty members entering service without a Ph.D. shall be encouraged to enroll themselves/acquire Ph.D. in the relevant branch/discipline from Institutes/ Universities of repute (IISc Bangalore, IITs, JNU, NITs, IIITs and Central Universities of repute). • One needs to claim the Ph.D. tuition fee reimbursement within a month after award of degree by submitting a copy of degree certificate and tuition fee paid slips. • Two Research Publications in SCI Journals with the affiliation as "KIET Group of Institutions, Delhi-NCR, Ghaziabad"(Annexure B). • Faculty should submit the undertaking for serving the Institute for at least one year. In case of non-fulfillment of serving for one year, faculty member should refund the reimbursed Ph.D tuition fee.
2.	ODs	• The maximum total number of ODs for completing a Ph.D. is 12 per academic year/leave year for a maximum 4 years. • Maximum of 3 ODs at a stretch can be given to a faculty member in a month at the discretion of HoD (provided there is no academic loss of students) just after the Ph.D registration. • Faculty may avail the facility of OD for pursuing Ph.D. immediately post joining KIET. • If the course work of Ph.D. program falls during summer break, then faculty must consume their summer vacation first (two weeks) and rest will be treated as OD provided the count remains 12 ODs per academic/ leave year. • For completing the course work 3-4 months Leave without pay (LWP) can be given to faculty members at the discretion of HoD provided there is no academic loss of students and department will be able to manage without any substitute.	• Submission of Ph.D registration document (admission letter, fee receipts and copy of NOC) to HR Department.

3.	Incentives on Award of Ph.D. Degree	• Five increments shall be admissible at the entry-level of recruitment to faculty members possessing the degree of Ph.D (full time), awarded in the relevant discipline from Institute/ University of repute (IISc Bangalore, IITs, JNU, NITs, IIITs and Central Universities of repute). • Faculty members who complete their Ph.D. degree (part time) while in service shall be entitled to three increments.	• Ph.D. is in the relevant branch/discipline and has been awarded by a University and two Research Publications in SCI Journals with affiliation as "KIET Group of Institutions, Delhi-NCR, Ghaziabad". • One needs to claim the Ph.D incentives within a month after the award of the degree by submitting a copy of degree certificate/provisional degree certificate • The Ph.D. incentives in terms of increments will be applicable from the date of submission of the application copy along with the copy of the degree certificate/provisional degree certificate. • During recruitment, if faculty intimates that the Ph.D thesis has been submitted, then faculty will have to complete the Ph.D within one year for entitlement of five increments else three increments would be awarded.

For Improving the Quality of Research by Faculty and Creation of New Knowledge and Strategies for Improving Research Culture, proposed Research Guidance Policy has been divided into three categories:

B.1 Guidelines for Research Supervision by Senior Faculty Member to Junior Faculty Member within the Department

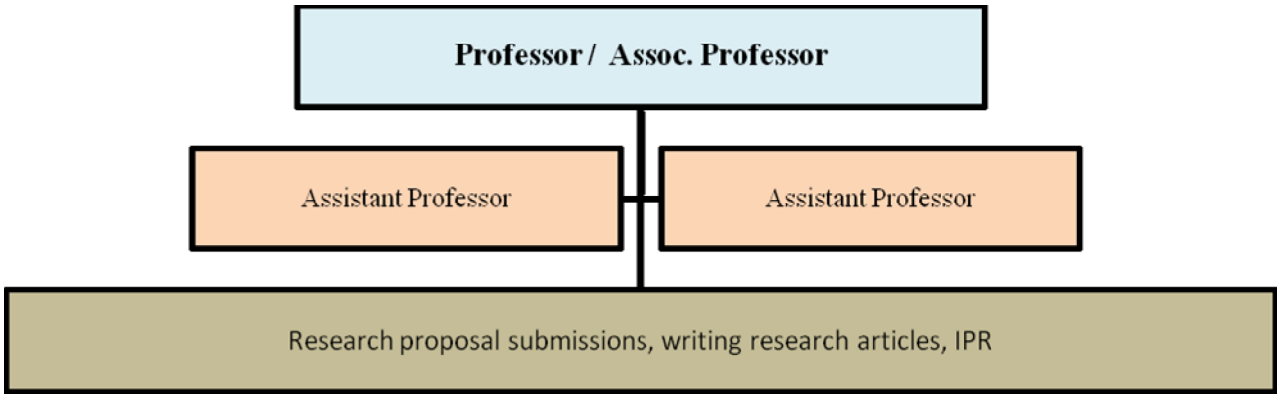
- Senior Faculty Members (Professors and Associate Professors) of Department should work as Mentor for 4-5 junior faculty members (Assistant Professor) for research guidance to meet research targets of the Department.

- All Non Ph.D. faculty members are required to register themselves in association with Ph.D. Faculty Members of KIET Group of Institutions, as a Supervisor/Co-supervisor in Ph.D. Program from the following University as soon as possible:

  - Dr. APJ Abdul Kalam Technical University, Lucknow
  - DTU, Delhi
  - JMI, New Delhi
  - IIT, Delhi
  - IIIT, Delhi
  - NSTU, New Delhi
  - JNU, New Delhi
  - NIT, Delhi
  - IP University, New Delhi
  - Jamia Hamdard University, New Delhi
  - IGTUW, New Delhi
  - University of Delhi

- All the Ph.D. faculty members should approach to the University or Institute from where he or she has completed Ph.D. for Collaborative Research, Ph.D. Guidance as Co-Supervisor and for providing assistance for Ph.D. admission for non-Ph.D. faculty members of the department.

- Professors/ Associate Professors should work as mentors for Assistant Professors for guiding them for Research grant proposals, writing research articles for SCI Journals and filing Patents etc.



B.2 Guidelines for Research Group Formation Under Centre of Excellence in Various Departments for Supervision of UG and PG Students

- The objective of formation of Research Group in the respective departments as per the given hierarchy is to promote Research culture among the students by publications of Research papers in SCOPUS indexed Conferences, Journals and Patents.

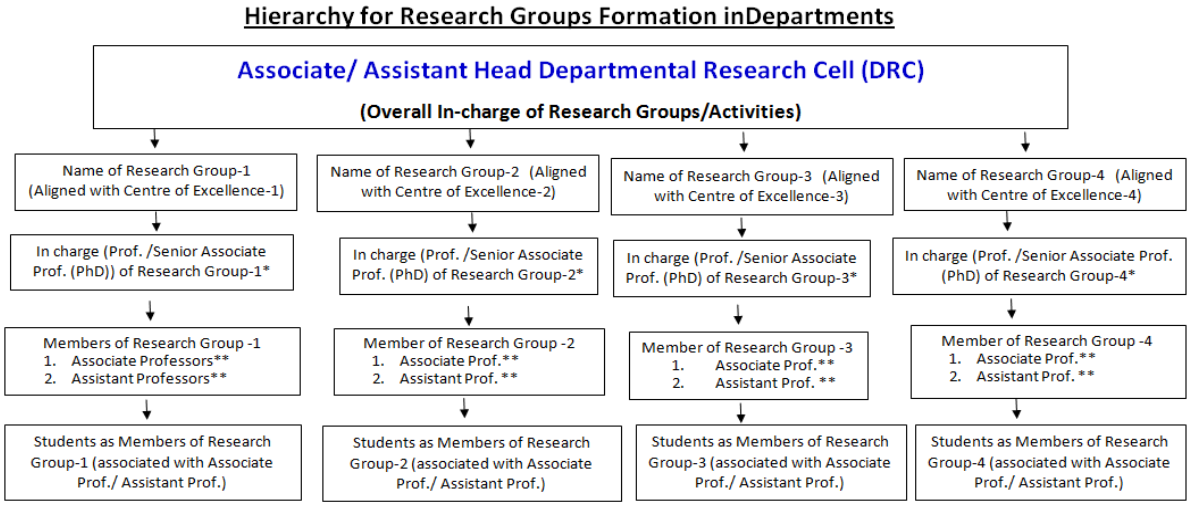
- All the departments should form 4 to 5 Research groups based on the availability of resources/ Centres of Excellence and specialization of Ph.D. faculty members. The Associate/ Assistant Head Departmental Research Cell (DRC) will be the overall incharge of the all Research Groups of the Department.

- All the faculty members (Associate/Assistant Professors) of the Department should be the member of one of the Research Group based upon the specialization or Research Area. Each Incharge of the various Research Group/ Centre of Excellence of the Department will submit the future Road Map (Outcome Based like Number of Research Publications in SCI/SCOPUS Journals, SCOPUS Indexed Conferences, Patents etc.) after formation of Research Group as per the below given Hierarchy Structure and are also required to submit the progress report on monthly basis to the Associate/ Assistant Head Departmental Research Cell (DRC) of respective departments.

- The Associate/ Assistant Head Departmental Research Cell (DRC) should issue the notice to the students for registration based upon his or her interest in the various Research Groups before the start of each semester and submit the Structure of Research Groups of respective departments as per the given Hierarchy Model to the Office of the Dean R&D in every semester.

- The Associate/ Assistant Head Departmental Research Cell (DRC) should also submit the Research Targets of each faculty member of the department for each session to the Office of the Dean R&D before the start of each semester.

Hierarchy for Research Groups Formation in Departments



- All faculty members of respective departments should also work as a Mentor for 10 students from First Year onwards to enhance research culture among students. The outcome of research guidance of students may be in terms of publications of research papers and Patents. The Mentor is expected to provide a framework within which the Research work can take place by:
  - Setting up regular meetings with students for interaction and information flow;
  - Ensuring that students are given timely advice about writing Research papers, filing patents etc.
  - Ensuring compliance with any legal, professional, ethical guidelines as per KIET Ethics Policy.
  - Identifying and helping students for acquiring any missing skills required for their research work.

B.3 Guidelines for Ph.D. Research Supervision (Supervisor/Co-Supervisor)

- All Ph.D. faculty Members can also provide research guidance to Ph.D. Scholars as Supervisors or Co-supervisors (as per Annexure-A) reputed Universities recognized by UGC like:

  - Dr. APJ Abdul Kalam Technical University, Lucknow
  - Delhi Technical University, Delhi
  - Jamia Millia Islamia, New Delhi
  - NSTU, New Delhi
  - IP University, New Delhi
  - Jamia Hamdard University, New Delhi
  - Indira Gandhi Technical University for Women, New Delhi
  - SRM University, Modinagar

- Amity University, Noida
- Jaypee University, Noida
- Bennett University, Noida
- DIT University, Dehradun
- Uttrakhand Technical University, Dehradun

Research in any discipline of thought is an ongoing process of enhancing the existing fund of knowledge by exploring new frontiers that challenge the human quest for understanding reality. The question of the quality of research underscores whether the research in any branch of knowledge enriches knowledge ecosystem in a significant manner. The question of the quality of research has become the centre of academic, professional, and higher education policy, debates all over the world. A doctoral thesis is expected to be a significant original and independent contribution to knowledge in a chosen field of study and be of such lasting value as to merit publication. It should demonstrate an ability to select an important problem and deal with it completely including an ability to effectively communicate what has been achieved through the research activity. A guide or a supervisor plays a very important role in the entire process viz., identification of the topic of research, formulation of the problem in a manner that is appropriate for the degree, guidance about the nature of research and the standard expected, planning research so as to complete it in accordance of the time table specified by the university, writing the thesis and getting it examined.

A Research Supervisor/Co-supervisor who is a Professor, can guide up to 8 Ph.D. scholars; an Associate Professor up to 6 Ph.D. scholars&AssistantProfessor 4 Ph.D. scholars; inclusive of all, at any given point of time. However, he/she shall not have more than three Ph.D. scholars at a time if another Supervisor in the same field is available with less than three Ph.D. scholars under him. All this is subject to the fulfillment of all duties assigned from time to time to him/her. At any given point of time, no supervisor can have more than the following number of Ph.D. Ph.D. scholars under his/her supervision:

- Professors – 8 Ph.D. Scholars
- Associate Professors – 6 Ph.D. Scholars
- Assistant Professors – 4 Ph.D. Scholars

Once Guide and the broad topic have been decided, further details of theproblem are formulated in a manner that it enables research embodying new knowledge appropriate for the degree to be completed within the specified time. Experience of the Guide is an essential element in formulating the problem and it is Guide's responsibility to ensure that the details are appropriately worked out. The Guide has to ensure that appropriate literature survey is done by the Ph.D. scholars and the Ph.D. scholars are able to defend the proposal before the doctoral committee. The Guide is expected to provide a framework within which the academic work can take place by:

- Setting up regular schedule of meetings with Ph.D. scholars to allow for regular interaction and information flow;
- Reaching agreement with Ph.D. scholars on indicators of progress being made and dates for submission of progress reports; and
- Providing regular and prompt feedback on progress to Ph.D. scholars (including written feedback on written work within two weeks unless the written work is extensive).

The Guide is expected to provide academic guidance by:

- Providing scholarly direction; encouraging Ph.D. scholars in his/her academic work;
- Ensuring that appropriate time table for the completion of each phase of the work is established;

- Ensuring that Ph.D. scholars is given timely advice about style requirements and about the mechanics of presenting a thesis;
- Ensuring compliance with any legal, professional, ethical or safety guidelines associated with the project; and identifying and helping Ph.D. scholars, to acquire any missing skills for his/her research.

The Guide is also expected to encourage the Ph.D. scholars into wider contacts asappropriate to the discipline by:

- Encouraging seminar and conference presentations;
- Helping Ph.D. scholarsto make contacts with other scholars in the field; and
- Helping Ph.D. scholarsto publish his/her work as appropriate.

B.4 Responsibilities of Supervisor/ Co- Supervisor

The supervisor is responsible for the physical and intellectual climate in which the PhD researcher develops and carries out his/her research project. He/she plays a stimulating, coordinating and evaluating role for the entire duration of the doctoral process. In addition, the supervisor ensures that during his/her training thePhD researcher can also acquire other essential skills that will enable him/her to move on to another job, within or outside academia, after the completion of the Doctoral Programme. A good supervisor has the qualities necessary to ensure the correct context and support for each of his/her PhD researchers:

- The supervisor is an active researcher and has built up a solid reputation. Depending on the length of the academic career and the research area, this can be deduced from scientific publications, citations, invitations to contribute at conferences and successful bids for research funding, amongst other things.
- The supervisor has built up his/her reputation in a research area that is sufficientlyrelated to the area in which the PhD researcher is carrying out his/her research, so as to be able to give the necessary supervision.
- The supervisor is responsible for the quality of the research plan of the PhD researcher.
- The supervisor ensures close supervision. The supervision includes ample opportunity for the PhD researcher to discuss planning, implementation and results of the research with qualified researchers. Research units and supervisors examine how the PhD researcher can be offered efficient and high-quality supervision. Regular formal and informal contact moments between the PhD researcher, the supervisor and/or the supervisory team are at the heart of good supervision. The contact moments between the PhD researcher and the supervisor are laid down in the work agreements made during the annual performance reviews. The concrete tasks of the supervisor and/or the supervisory team are:

    - To help the PhD researcher plan, implement and if necessary adjust the research.
    - To help the PhD researcher place the research in a broader context.
    - To help the PhD researcher interpret and analyze the research results obtained.
    - To encourage the PhD researcher to present his/her work, to be present on these occasions on a regular basis and to give the PhD researcher feedback on his/her performance.
    - To challenge the PhD researcher to think critically about his/her own research work.
    - To introduce the PhD researcher to the world of research by (1) involving him/her in research that is being carried out in the research group and (2) by bringing him/her into contact with other researchers within the research area and international network, by for

example encouraging him/her to take an active part in conferences and to work at
- Another research institution.
- To encourage the PhD researcher to publish his/her work, to point out publication opportunities and to help him/her prepare for publications.

- The supervisor and the supervisory team bear a considerable part of the responsibility for the doctoral process and for the publications that arise from the doctoral research. They give the PhD researcher as many opportunities as possible to be first (co)author on publications that valorize the work he or she has carried out.

  - As a team leader the supervisor ensures that the PhD researcher is monitored and coached as a member of the team. This includes, amongst other things, regular performance and career reviews.
  - The supervisor creates a research environment in which fair and honest scientific conduct (e.g. responsible authorship, avoiding conflict of interest) are the norm (KIET Ethics Policy). In addition, the supervisor provides clarity concerning the nature of dishonest conduct within the context of the scientific domain. In the event of any problems the supervisor takes suitable action, in consultation with the PhD researcher.
  - The supervisor is jointly responsible for the efficient progress of the doctoral process. The supervisor encourages the PhD researcher to complete his/her thesis within a reasonable timeline.
  - The supervisor gives the PhD researcher ample notice about any career opportunities after the doctoral degree has been obtained, or refers him/her to the relevant services in this respect.
  - The supervisor is jointly responsible for creating a pleasant professional work environment and for the integration of the PhD researcher into the research group. This includes taking into account any personal matters that may have an impact on the research.

Annexure-A

Details of Ph. D. Guidance by KIET Faculty Members

Sr. No.	Faculty Name	Department	Awarded	University Name	Ongoing	University Name
1	Dr. Vipin Kumar	AS	1	J.C.Bose University of Science and Technology, Faridabad (1)	2	AKTU Lucknow (2)
2	Dr. Ekata	AS	2	Mewar University Chittorgarh (2)	-	
3	Dr. Neelam Sharma	AS	-		1	Mewar University Chittore (1)
4	Dr. Sachin Kumar	AS	-		2	AKTU Lucknow (2)
5	Dr. K. P. Mishra	AS	-		2	Monard University Hapur (2)
6	Dr. Deepti Seth	AS	-		1	AKTU Lucknow (1)
7	Dr. Shailendra Kumar Tiwary	CE	-		3	DIT University, Dehradun (2) Galgotia University, Greater Noida (1)
8	Dr.Sanjeev Singh	CE	2	Sunrise University (2)	2	Uttrakhand Technical University. Dehradun (1) Venkateshwara University (2)
9	Dr. Vineet Kr Sharma	CSE	1		4	AKTU, LUCKNOW (3), JamiaMilliaIslamia, New Delhi (1)
10	Dr. Anil K Ahlawat	CSE	7		4	AKTU, LUCKNOW (3), GGSIP University, New Delhi (1)
11	Dr. Anand Prakash Shukla	CSE			1	Amity University, Noida (1)
12	Dr. Dilkeshwar Pandey	CSE			2	AKTU, LUCKNOW (2)
13	Dr. Sanjeev Kr Yadav	CSE			1	Bennett University, Greater Noida (1)
14	Dr. Sanjay Sharma	ECE	02	AKTU, Lucknow (2)	2	YMCA University, Faridabad Indira Gandhi Dehli Technical University for Women, New Delhi (1)
15	Dr. Vibhav Kr. Sachan	ECE			05	IFTM University, Moradabad, UP (1) Indira Gandhi Dehli Technical University for Women, New Delhi (2) SRM University, Modinagar (2)
16	Dr. Neeraj Kumar Gupta	EN			2	AKTU, Lucknow (2)
17	Dr. Arvind Kumar Sharma	EN			1	DCRUST, Murthal
18	Dr. Ajay Agarwal	IT	2	AKTU, Lucknow (1) Monad University (1)	3	Uttarakhand Technical University, Dehradun (2) IFTM , Moradabad (1)
19	Dr. VikasGoel	IT			2	Venketeshwara University (2)
20	Dr. Adesh Kumar Pandey	IT			1	Shri Venkateshwara University, Gajraula

21	Dr. K. Nagarajan	KSOP	1	Sridhar University, Pillani (1)	3	AKTU, Lucknow (2) Amity University, Noida (1)
22	Dr. Vaishali M. Patil	KSOP			2	Uttarakhand Technical University (1) AKTU, Lucknow (1)
23	Dr. Ashu Mittal	KSOP			1	AKTU, Lucknow (1)
24	Dr. Binkey Srivastava	MBA	1 (Sub.)	Mewar University, Rajasthan	6	AKTU, Lukhnow (2) Mewar University, Rajasthan (4)
25	Dr. RanchayBhateja	MBA	-		1	AKTU, Lukhnow (1)
26	Dr. Prateek Gupta	MBA	-		4	AKTU, Lukhnow (4)
27	Dr. Mani Tyagi	MBA	-		1	AKTU, Lukhnow (1)
28	Dr. NitinGirdharwal	MBA	-		1	AKTU, Lukhnow (1)
29	Dr. MeenakshiTyagi	MBA	-		1	Mewar University, Chitaurgarh, Rajasthan (1)
30	Dr. Shivani Agarwal	MBA	-		2	AKTU, Lukhnow (2)
31	Dr Ajay Srivastava	MCA	-		1	AKTU, Lucknow
32	Dr. Arun Kumar Tripathi	MCA			1	Invertis University, Bareilly (1)
33	Dr. Amit Kumar Gupta	MCA	6	NIMS, Jaipur (5) Venkateshwara University (1)	2	Shri Venkateshwara University, Amroha (2)
34	Dr Amit Kumar	MCA			1	AKTU, Lucknow
35	Dr. Ashish Karnwal	ME	1	JMI DELHI	0	
36	Dr. K.L.A. Khan	ME			2	AKTU Lucknow (2)
37	Dr. PratibhaKumari	ME			1	Sharda University (1)
38	Dr. Anurag Gupta	ME			1	AKTU Lucknow (1)
	Total Ph.D. (Guided/Guiding)		**25**		**75**	

Ways to write two affiliations in one Research paper

ELSEVIER

CrossMark

Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 83 (2016) 750 – 757

Procedia Computer Science

The 6th International Conference on Sustainable Energy Information Technology (SEIT 2016)

Scopus-Based Analysis of Peer-Reviewed Literature Related to Solar Energy in GCC Countries

Bilal Akash[a,*], Ahmad M. Abu Abdo[a], Omar Akash[b], Mousa S. Mohsen[a,b]

[a] School of Engineering, American University of Ras Al Khaimah, Ras Al Khaimah, United Arab Emirates
[b] RAK Research & Innovation Center, American University of Ras Al Khaimah, Ras Al Khaimah, United Arab Emirates

Abstract

This paper analyzes and presents the solar energy research status in the GCC countries using Scopus-database. Its findings may be valuable for researchers, politicians, industry, or decision makers to see how much the participation of the GCC countries in the field of solar energy and how it compares to other countries. The data gathered from Scopus database aided in outlining and identifying the active institutions and researchers in the field of solar energy in the GCC. In terms of the largest contribution, Saudi Arabia has the highest research output (with more than 60% of the published articles in the GCC), followed by the UAE (about 17%) and the remaining percentage is the contribution of the other GCC countries.

Peer-review under responsibility of the Conference Program Chairs

Keywords: Solar Energy; Bahrain; Kuwait; Oman; Qatar; Saudi Arabia; United Arab Emirates; GCC Countries; Scopus Database

1. Introduction

With the depletion of oil and gas resources, the GCC countries realized that they have to depend less on oil and gas and must start relaying on other sources of energy such as solar energy. Electricity consumption is as high as 1.15 kW/person, especially, due to the large growth rate in demand at about 9.5%[1]. In a recent study, the possibility of replacing gas-based heaters with parabolic trough concentrated solar power plants in conjunction of thermal energy storage system was conducted, to investigate overcoming the daily fluctuations in availability of solar

* Corresponding author. Tel.: +971-7-2210500 Ext. 1152; Fax: +971-7-2210638.
E-mail address: bilal.akash@aurak.ac.ae

Peer-review under responsibility of the Conference Program Chairs
doi:10.1016/j.procs.2016.04.163

Scientia Iranica (2019) 26(1), 40–58

Sharif University of Technology
Scientia Iranica
Special Issue on: Socio-Cognitive Engineering
http://scientiairanica.sharif.edu

Teaching music to children with autism: A social robotics challenge

A. Taheri[a,d], A. Meghdari[a], M. Alemi[a,b,*], and H.R. Pouretemad[c,d]

a. *Social & Cognitive Robotics Laboratory, Center of Excellence in Design, Robotics and Automation (CEDRA), Sharif University of Technology, Tehran, Iran.*
b. *Faculty of Humanities, West Tehran Branch, Islamic Azad University, Tehran, Iran.*
c. *Institute for Cognitive and Brain Sciences (ICBS), Shahid Beheshti University, Tehran, Iran.*
d. *Center for the Treatment of Autistic Disorders (CTAD), Tehran, Iran.*

Received 8 May 2017; accepted 4 December 2017

KEYWORDS
Music-based therapy;
Xylophone;
Autism Spectrum Disorders (ASD);
Human-Robot Interaction (HRI);
Social robots;
Social and cognitive skills;
Imitation;
Joint attention.

Abstract. Utilizing a humanoid social robot to systematically teach music to children with autism has not received enough attention to date. In this study, a novel robot-assisted music-based scenario was designed in order to: 1) teach fundamentals of music via a xylophone-/drum-player robot as a teacher assistant, and 2) improve social/cognitive skills through active music games in children with autism. The educational-therapeutic interventions were conducted in an eleven-session case study program on three high-functioning and one low-functioning children with autism taking into consideration the children's, parents', and therapists' experience during the program. The results indicated that, as a tool and facilitator, the NAO robot does have the ability to teach musical notes/rhythms to the participants with high-functioning autism. It was also observed that the severity of the participants' autism as well as the stress of the parents decreased somewhat during these sessions. Furthermore, noticeable improvements were seen in social/cognitive skills of all four participants as well as in the positive effect of this program on fine motor imitation skills of two subjects after the interventions. The progress reported from this preliminary exploratory study confirmed the potential benefits of using social robots and intelligent technologies as facilitators in music-teaching and cognitive-rehabilitation.

1. Introduction

Music has the power to influence humans and, in particular, children's emotions, moods, and feelings. Teaching music can help develop new or improve existing social, verbal/non-verbal communication skills in children [1-3]. Children who receive regular music education may have better movement, math, and reading skills in comparison to their peers [4].

Children with autism may have stereotyped behaviors and limited communication skills [5]. Music could be an effective way to involve them in rhythmic/non-verbal communication [1]. Nowadays, at least 12% of all treatments of ASD (Autism Spectrum Disorders) consist of music-based therapies [6].

Music is used in therapeutic sessions for children with mental and behavioral disabilities [7]. There is ample evidence that shows either playing music during therapy sessions or teaching music to children with autism can significantly increase the impact of therapy sessions [8,9]. These studies have inspired researchers

*. *Corresponding author*
E-mail addresses: taheri@mech.sharif.edu (A. Taheri); meghdari@sharif.edu (A. Meghdari); alemi@sharif.edu (M. Alemi); h-pouretemad@sbu.ac.ir (H.R. Pouretemad).

doi: 10.24200/sci.2017.4608