Education Research: The pod system

An innovative strategy to reform residency teaching sessions in neurology

Scott J. Stevens, MD
Alice Fornari, EdD
Ronald Kanner, MD

Correspondence to
Dr. Stevens:
sstevens2@nshs.edu

The foundational principles of adult learning theory, which include self-directed learning, experiential learning, and situated learning, can be applied to resident teaching, allowing the residents to control their own learning experience.¹ The activity theory of learning expands learning from acquisition of knowledge to participation to assure a dynamic context for the learning environments. Acquiring knowledge, i.e., knowing, requires legitimate participation in the learning environment that is dynamic and continues over time.²

Elkind,³ during the 2008 meeting of the American Academy of Neurology, addressed a challenge to academic neurologists to reinvigorate their commitment to teaching the next generation of neurologists and establish communities of educators taking seriously the teaching role they have the privilege to hold. The democratization of knowledge supports a recalibration of the educational hierarchy and how information flows in the educational environment. He concludes, “in the future, it is possible that each generation will offer complementary skills in educating the others to provide optimal care.”

The Accreditation Council for Graduate Medical Education resident survey (2011) reflected dissatisfaction among our residents with the educational component of their neurology training program. This resulted in educational demands from the chairman to revise the delivery of the didactic curriculum to residents, leading to the development of the pod system. This system was modeled after peer-assisted learning (PAL), defined as “people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching.”⁴

The purpose of this study was to assess the redesign of the delivery of neurology educational content from faculty-based didactic lectures (passive learning) to an active learning approach resulting from resident-driven collaboration, curriculum development, and implementation.

This prospective study evaluated resident and faculty satisfaction with the educational portion of the residency training program after the implementation of a collaborative active learning pedagogical style for all didactic sessions. The primary outcomes were satisfaction with resident didactics and perceived impact of teaching on resident fund of knowledge.

METHODS Setting. The study was conducted at the Hofstra North Shore–LIJ Neurology Residency Program in New York.

Participants. The subjects were all the neurology residents across all 3 years of training as well as 7 faculty advisors.

Formation of pod groups. There were 7 pod groups created on a random basis each year, consisting of 3 residents, 1 from each postgraduate year, working under the supervision of an attending neurologist.

Curriculum delivery. There were 3 hours of weekly protected educational time with one pod group leading an interactive large group discussion. Each group, led by a PGY4 resident, met for 1 hour twice per month with their faculty advisor to prepare for their discussions.

Faculty participation and recruitment. Pod faculty advisors were chosen by the Residency Director based upon their teaching ability and rapport with the residents.

Institutional review board exemption. The study protocol and surveys were submitted to the North Shore–LIJ Institutional Review Board and received exemption status.

Survey development. Prior to the initiation of the pod system, all the residents completed a pre-pod survey to assess their perception of the adequacy of their medical knowledge and satisfaction with the educational component of their training program. A follow-up survey was distributed on a yearly basis to all the neurology residents, for 3 consecutive years. A faculty survey was devised from slight modifications to 3 of the questions from the resident survey in addition to a question on overall satisfaction with the pod system.

Supplemental data
at Neurology.org

From Advanced Clinical Experience in Neurology (S.J.S.), Education Skills Development (A.F.), and Neurology, Harvey Cushing Institute of Neuroscience (R.K.), Hofstra North Shore–LIJ School of Medicine; and Faculty Development (A.F.), North Shore–LIJ Health System, Great Neck, NY.

Go to Neurology.org for full disclosures. Funding information and disclosures deemed relevant by the authors, if any, are provided at the end of the article.

Outcome question. This prospective study evaluated resident and faculty satisfaction with the educational portion of the residency training program and residents' perception of themselves as teachers. Data from 2 outcome measures were analyzed: (1) satisfaction with resident didactics and (2) perceived impact of teaching on resident fund of knowledge.

Data collection. All survey data were collected using Survey Monkey software sent via e-mail. The residents were notified that participation in the surveys was voluntary and anonymous.

Data analysis. The survey data included frequencies and percentages for each question. Descriptive statistics were calculated. Fisher exact test was used to determine if there were statistically significant differences between pre-pod and summative post-pod survey responses.

RESULTS Demographics. From October 2011 through June 2012, the residents in the Hofstra North Shore–LIJ School of Medicine Neurology Residency Training Program participated in the pod system. Twenty residents completed a pre-pod survey in 2011. The same 20 residents in June 2012, 18 residents in June 2013, and 17 residents in June 2014 completed an identical post-pod survey. One resident in 2012, 3 in 2013, and 4 in 2014 failed to complete the post-pod survey by the deadline without specific reason.

Resident data. Resident data from the pre-pod survey ($n = 20$) and 3 post-pod surveys ($n = 55$) were analyzed (table 1).

There was an increase in resident satisfaction with the educational component of their program and perceived medical knowledge after participating in the pod system, with 5 of the 6 questions showing a significant increase in positive responses ($p < 0.05$) compared to the pre-pod survey. More residents agreed with the statement "I feel that teaching from the faculty helps prepare me for the RITE examination" after participating. However, this was not statistically significant ($p = 0.1712$). After the first year, residents' responses to "Rate your satisfaction with the educational component of the training program" did not continue to rise in the coming years, even though the participants continued to express more satisfaction than at baseline.

Faculty data. There were no significant differences ($p > 0.1$) in faculty responses from the 3 years studied. The same 7 faculty members completed the survey on a yearly basis (2012 through 2014). Faculty responded to the following 4 questions: (1) "Since the initiation of the pod system, I think that the medical knowledge of the residents in neurology has (fill in blank)." One hundred percent of the faculty answered increased or strongly increased. (2) "Since the initiation of the pod system, rate your satisfaction of faculty involvement in the education of the residents." One hundred percent of the faculty answered

satisfied or very satisfied. (3) "Since the initiation of the pod system, please rate your satisfaction with the educational component of the residency training program." A total of 86% of the faculty answered satisfied or very satisfied. (4) "I am satisfied with the pod system for residency education." A total of 86% of the faculty answered satisfied or very satisfied.

Qualitative data. Qualitative comments from residents and faculty on post-pod surveys can be found on table e-1 on the *Neurology*[®] Web site at Neurology.org. These selected quotes represent repeated responses on the qualitative portion of the survey.

DISCUSSION The results of our study show that the pod system was viewed favorably by both residents and faculty. Both the residents and faculty learned from each other and were able to share ideas as a group, promoting individual thinking and dialogue including diverse perspectives on neurologic topics. This outcome supports the principles outlined for adult learning theory¹ and more specifically a learning environment based on activity theory, where learning is not passive and is participatory in a dynamic environment.² This is a sharp contrast to a more traditional postgraduate educational hierarchy in which information passively flows from faculty to residents. With our pod system, there is a shift in hierarchy supporting an interactive collaborative PAL environment that assures a multidirectional flow of information among faculty and residents at all levels.

The pod structure of mixed PGY level learners and a faculty identified as a facilitator, not the teacher, of the small group of learners is in line with Elkind's³ democratization of knowledge.

A trend to address is a decline in faculty time and rewards for teaching.³ The pod system increased faculty satisfaction with the educational program. This satisfaction is an inherent reward to faculty who are time pressured in their educational role.

The greatest resident satisfaction with the new educational model, pod, was noted after year 1. The residents embraced the change in structure early on, and as it continued most were still satisfied but appropriately became more critical of the pod model to encourage further refinements; therefore, overall resident satisfaction decreased, even though it was still higher than baseline. Furthermore, these data were self-reported by residents, and therefore accuracy is a concern based on literature indicating that self-assessment can be flawed.^{5,6} We anticipate that with further refinements resident satisfaction will increase in the coming years.

A logistical limitation in the pods was the difficulty in scheduling a time for all members to meet in person. Noting that millennial learners are comfortable with using technology, in the future we will use Internet-based applications to facilitate

Table 1 Pre-pod and post-pod resident survey data

Question	Pre-pod (n = 20)	Post-pod 2012 (n = 20)	Post-pod 2013 (n = 18)	Post-pod 2014 (n = 17)	Post-pod total (n = 55)
The program has created an environment in which I can adequately apply basic science material to the care of patients (Outcome 2: Perceived impact of teaching and fund of knowledge)					
Agree	9 (45)	19 (95)	17 (94)	13 (76)	49 (89)
Neutral	8 (40)	1 (5)	1 (6)	2 (12)	4 (7)
Disagree	3 (15)	0 (0)	0 (0)	2 (12)	2 (4)
Preparation of presentations for basic science lectures allowed me to obtain a firm grasp of the material presented (Outcome 2: Perceived impact of teaching and fund of knowledge)					
Agree	11 (55)	19 (95)	15 (83)	12 (70)	46 (84)
Neutral	5 (25)	1 (5)	1 (6)	3 (18)	5 (9)
Disagree	4 (20)	0 (0)	2 (11)	2 (12)	4 (7)
I believe that my medical knowledge of neurology is adequate (Outcome 2: Perceived impact of teaching and fund of knowledge)					
Agree	9 (45)	17 (85)	15 (83)	14 (82)	46 (84)
Neutral	6 (30)	3 (15)	1 (6)	2 (12)	6 (11)
Disagree	5 (25)	0 (0)	2 (11)	1 (6)	3 (5)
Rate your satisfaction of faculty involvement in your education (Outcome 1: Satisfaction with resident didactics)					
Satisfied	8 (40)	18 (90)	15 (83)	11 (65)	44 (80)
Neutral	4 (20)	2 (10)	1 (6)	4 (23)	7 (13)
Dissatisfied	8 (40)	0 (0)	2 (11)	2 (12)	4 (7)
I feel that the teaching from faculty helps prepare me for the RITE Examination (Outcome 1: Satisfaction with resident didactics)					
Agree	10 (50)	15 (75)	13 (72)	11 (64)	39 (71)
Neutral	8 (40)	5 (25)	4 (22)	5 (30)	14 (25)
Disagree	2 (10)	0 (0)	1 (6)	1 (6)	2 (4)
Rate your satisfaction with the educational component of the training program (Outcome 1: Satisfaction with resident didactics)					
Satisfied	7 (35)	16 (80)	13 (72)	11 (65)	40 (73)
Neutral	7 (35)	4 (20)	1 (6)	3 (18)	8 (14)
Dissatisfied	6 (30)	0 (0)	4 (22)	3 (18)	7 (13)

Abbreviation: RITE = Residency In-service Training Examination.

Values are n (%). Agree = resident answered strongly agree or agree; disagree = resident answered disagree or strongly disagree; satisfied = resident answered satisfied or very satisfied; dissatisfied = resident answered somewhat dissatisfied or dissatisfied.

collaborative learning.³ Additional limitations with our study are the lack of a parallel control group using conventional didactic teaching methods. It is a difficult methodologic structure to not offer educational innovation to all trainees, especially within a small residency program. Finally, residents and faculty evaluating the curriculum delivered by the pod format were the same people planning the new curriculum change. This could create an inherent bias of evaluators to find favor in curricular changes in which they invested time.

It should be noted that our study measures perceptions rather than measurable changes in knowledge, such as the Residency In-service Training Examination (RITE) examination, which was not part of our study design. Future studies can be designed to evaluate the impact of the pod system beyond self-perception/report data to actual knowledge acquisition as indicated by RITE examination scores.

The pod system we implemented supported the challenge outlined by Elkind³ for neurology education programs and can hopefully stand as an

educational model for other training programs in graduate medical education having similar educational goals.

AUTHOR CONTRIBUTIONS

Dr. Stevens was the first author on the manuscript. He was involved in the design and conceptualization of the study, the analysis and interpretation of the data, and in drafting and revising the manuscript. Dr. Fornari is a co-author who was involved in the design of the study, the analysis and interpretation of the data, and in drafting and revising the manuscript. Dr. Kanner is a co-author who was involved in the conceptualization and design of the study and in revising of the manuscript.

ACKNOWLEDGMENT

Statistical analysis performed by Meredith Akerman, MS, Associate Biostatistician, North Shore–LIJ Health System Feinstein Institute for Medical Research.

STUDY FUNDING

No targeted funding reported.

DISCLOSURE

The authors report no disclosures relevant to the manuscript. Go to Neurology.org for full disclosures.

REFERENCES

1. Bennett E, Blanchard R, Hinchey K. Applying Knowles' andragogy to resident teaching. *Acad Med* 2012;87:129.
2. Bleakley A. Broadening conceptions of learning in medical education: the message from teamworking. *Med Edu* 2006;40:150–157.
3. Elkind MS. Teaching the next generation of neurologists. *Neurology* 2009;72:657–663.
4. Ross M, Cameron H. Peer assisted learning: a planning and implementation framework: AMEE guide no. 30. *Med Teach* 2007;29:527–545.
5. Sargeant J. Toward a common understanding of self-assessment. *J Contin Educ Health Prof* 2008;28:1–4.
6. Eva KW, Regehr G. "I'll never play professional football" and other fallacies of self-assessment. *J Contin Educ Health Prof* 2008;28:14–19.

Neurology®

Education Research: The pod system: An innovative strategy to reform residency teaching sessions in neurology

Scott J. Stevens, Alice Fornari and Ronald Kanner

Neurology 2016;86:e12-e15

DOI 10.1212/WNL.0000000000002258

This information is current as of January 11, 2016

Updated Information & Services	including high resolution figures, can be found at: http://n.neurology.org/content/86/2/e12.full
Supplementary Material	Supplementary material can be found at: http://n.neurology.org/content/suppl/2016/01/09/WNL.0000000000002258.DC1
References	This article cites 6 articles, 1 of which you can access for free at: http://n.neurology.org/content/86/2/e12.full#ref-list-1
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): All Education http://n.neurology.org/cgi/collection/all_education Methods of education http://n.neurology.org/cgi/collection/methods_of_education
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.neurology.org/about/about_the_journal#permissions
Reprints	Information about ordering reprints can be found online: http://n.neurology.org/subscribers/advertise

Neurology® is the official journal of the American Academy of Neurology. Published continuously since 1951, it is now a weekly with 48 issues per year. Copyright © 2016 American Academy of Neurology. All rights reserved. Print ISSN: 0028-3878. Online ISSN: 1526-632X.