Ruba Fahmi Bataineh
Yarmouk University, Jordan
rubab@yu.edu.jo
http://orcid.org/0000-0002-5454-2206

Lubna Ahmad Shawish
Ministry of Education, Jordan
lubna.shawish@gmail.com
https://orcid.org/0000-0002-5091-0649

Mohammad Khalid Al-Alawneh
Yarmouk University, Jordan
alaonh.m@yu.edu.jo
https://orcid.org/0000-0002-1521-5085

Shaping the Way We Teach English: Potential Effects of a Professional Development Program on Jordanian EFL Teachers' Instructional Practices[1]

ABSTARCT

This study examines the potential effect of *Shaping the Way We Teach English*, a teacher professional development program, on Jordanian English as a foreign language (EFL) teachers' instructional practices. The participants of the study are 20 Jordanian EFL teachers selected from 14 public schools in North Ghour Directorate of Education in the first semester of the academic year 2018/2019. Observations of the participants, along the seven domains of *classroom management, language, teaching strategies, learning strategies, assessment strategies, authentic materials,* and *reflection*, were conducted before and after the treatment to determine whether or not the treatment has an effect on the participants' instructional practices. Descriptive statistics were used to compare the participants' performance before and after the treatment. The findings revealed that the participants gained on all seven domains of the observation checklist, with statistically significant differences found (at α=0.05) in their instructional practices before and after the treatment, in favor of the latter. The study concludes with pedagogical implications and recommendations for further research.

Keywords: instructional practices, professional development, TPD

---

[1] This manuscript is an extension of the second author's doctoral dissertation per the regulations in force at Yarmouk University, Irbid, Jordan.

1. Introduction and Background

To develop twenty-first century student competencies, teachers must change the way they have traditionally taught and look for alternative teaching strategies to meet the requirements of this century (Mewborn & Huberty, 2004). Teachers also need to be equipped with the knowledge and skills needed to support student learning in a constantly changing environment (Al Omari & Bataineh, 2014; Bataineh, Bataineh, & Thabet, 2011, Bataineh & Bani Younis, 2016 to supplement international with local research.) and to determine appropriate learner competencies (Broad & Evans, 2006), as problem-solving, critical thinking, creative thinking, and effective communication skills are rudimentary for learning in an increasingly demanding society (Darling-Hammond & Richardson, 2009).

Teaching is a rather complex undertaking for novice and experienced teachers alike, especially as many teacher training programs are unable to cater for the growing range of competencies needed by effective teachers (Mizell, 2010). This is further compounded by the fact that professional development is not just training, as professional development involves, among other things, ongoing workshops, follow-up, reflection, observation, and assessment geared towards improving teacher practices which lead, in turn, to increased student learning (Oregon Department of Education, 2014).

Novice and experienced teachers alike face challenges, such as content change, technological advances, and evolving student needs, which necessitates career-long professional development to keep up with these advances and maintain effectiveness (Bharati & Chalise, 2017). Teacher professional development (Henceforth, TPD) is defined as the "sum total of formal and informal learning pursued and experienced by the teacher in a compelling and dynamic change" (Fullan, 1995, p. 265) which involves learning, engagement, and involvement in creativity and reflection to foster teaching practice (Bredeson, 2002), mastery of new skills, received and experiential knowledge (Wallace, 1991), insights into their pedagogy, practice and understanding of his/her own needs (Joshi, 2012)

For many years, the only form of professional development available to teachers was staff-development or in-service training. These forms of training consist of workshops or short-term courses that offer teachers new knowledge on a particular aspect of their work. More recently, the new paradigm in professional development (Villegas-Reimers, 2003) has comprised a long-term process which involves regular, systematically-planned opportunities and experiences to foster profession-related growth and development.

Professional development may manifest itself in many forms (Hooker, 2006), but the outcome is always the same. Richards and Farrell (2005), for example, discuss eleven strategies which facilitate ELT teachers' professional development (viz., workshops, self-monitoring, support groups, teaching journal, peer observation, teaching portfolios, critical incidents, case analysis, peer coaching,

team teaching, and action research). When surveyed, teachers reported positive effects for coherent, focused, and actively-participatory professional development (Darling-Hammond & McLaughlin, 1995; Garet, Porter, Desimone, Birman, & Suk Yoon, 2001), as opportunities are afforded to teachers not only to learn from best practices but also to exchange information and stay abreast of advances in ICTs and curriculum resources.

2. Problem, Purpose, Questions, and Limitations

An extensive review of the literature has revealed a dearth of local and international empirical research on the utility of TPD in developing EFL teachers' instructional practices. Empirical literature highlights the effectiveness of professional development programs on teachers' classroom performance (e.g., Giraldo, 2014; Hooker, 2006; Ingvarson, Meiers, & Beavis, 2005; Kennedy, 2016; Mizell, 2010; Porter, Garet, Desimone, Birman, & Suk Yoon 2000; King, 2012; Yarema, 2015). However, to the best of these researchers' knowledge, this research may be the first to examine the potential effect of *Shaping the Way We Teach English* on Jordanian EFL teachers' classroom performance.

Through their collective experience as teacher trainers, the authors have noticed that many teachers lack training in pedagogy and classroom practices, as few tailored training opportunities are available to them. This study is an attempt to develop teachers' classroom practices and raise their awareness of the effectiveness of TPD though implementing *Shaping the Way We Teach English*. More specifically, the study attempts to answer the following questions:

1. To what extent, if any, does *Shaping the Way We Teach English* affect EFL teachers' classroom performance?
2. Are there any statistically significant differences (at α=0.05) in the participants' instructional practices, which can be attributed to gender?

3. Sampling, Design, Instrumentation, and Implementation

The participants of the study are 20 Jordanian EFL teachers, selected conveniently from 14 public schools in two of the three divisions of the North Ghour Directorate of Education, Jordan, due to the proximity of these areas to the training center. The research adopts a quasi-experimental design with pre- and post- treatment-observations.

Based on their collective experience and a thorough review of the literature, the researchers adapted a classroom observation checklist from Opp-Beckman and Klinghammer (2006) along a three-point scale (viz., excellent, satisfactory, and poor). The checklist comprised 21 items under seven main headings (viz., *classroom management, language, teaching strategies, learning strategies, assessment strategies, authentic materials*, and *reflection*) which correspond to the modules of *Shaping the Way We Teach English*.

The validity of the checklist was established by a jury of 10 EFL practitioners whose notes were incorporated into its final version while its interrater reliability was established by having another English language supervisor co-observe with the second researcher. Pearson's coefficient between the two observations amounted to 98.6, deemed appropriate for the purpose of this research.

The treatment comprised the professional development program, *Shaping the Way We Teach English*, which consisted of 14 Modules (viz., *contextualizing language, building language awareness, integrating skills, pair and group work, learner feedback, managing large classes, learning strategies, authentic materials, critical and creative thinking, alternative assessment, individual learner differences, younger learners, peer observations and reflective teaching*). These modules comprise *video*-based segments, of 10–15 minutes each, by educators from around the world, *a training manual*, and *supplementary readings, activities* and *resources* (Opp-Beckman & Klinghammer, 2006). Supplementary activities (viz., *jigsaw, dictogloss, and contextualizing language by means of responding to certain scenarios, describing, interpreting, and making judgements*) were added to meet specific teachers' needs.

The content of the fourteen modules was regrouped under seven domains of one to three modules each (viz., *classroom management* (originally *managing large classes*), *language* (originally *using language in context, building language awareness,* and *integrating the four skills*), *teaching strategies* (originally *pair /group work* and *critical and creative thinking*), *learning strategies* (originally *learning strategies, learner feedback,* and *individual differences*), *assessment strategies* (originally *assessment strategies* and *learner feedback*), *authentic materials*, and *reflection* (originally *reflection* and *peer observation))*. Two modules per week were covered over the seven-week treatment. The participants presented their mini-lessons in the eighth and final week.

The study started with pre-observations as the trainer/second researcher visited the participants in their classrooms to assess their instructional practices at the onset of the treatment. The training commenced with an orientation session in which the trainer/second researcher introduced *Shaping the Way We Teach English*, the theme of each of its 14 modules, and its potential outcomes. She introduced the concept of *module* in terms of definition, characteristics, components, and potential utility. She then conducted pre-activities using content from the prescribed textbook series, *Action Pack 1–12*, to illustrate and build familiarity with the constituents of the treatment.

The participants watched the videos and filled in the observation sheet about each. They carried out activities from *Action Pack* and taught mini-lessons on the theme of each module throughout the treatment.

Post-observations were conducted after the eight-week implementation of *Shaping the Way We Teach English*. Following the treatment, the trainer/second

researcher revisited the participants in their classrooms to assess the potential effect of the treatment on their instructional practices. Both the trainer/second researcher and a colleague used the same pre-observation checklist to assess potential gain and simultaneously establish the interrater reliability of the observation.

4. Findings and discussion

The findings are presented and discussed according to the two questions of the research. To answer the first question, which addresses the potential effect of the professional development program on teachers' instructional practices, the means, standard deviations and paired t-test of the participants pre-and post- treatment instructional practices were calculated, as shown in Table 1.

Table 1. Means, standard deviation and paired t-test results of the participants' pre-and post-treatment practices·

No.	Domain		Mean	SD	t	Sig. (2-tailed)
1	Classroom Management	pre-	20.75	0.417	-2.179	.00
		post-	30.00	0.163		
2	Language	pre-	20.02	0.567	-6.571	.00
		post-	20.88	0.229		
3	Teaching Strategies	pre-	10.65	0.729	-8.354	.00
		post-	20.96	0.103		
4	Learning Strategies	pre-	10.55	0.565	-11.610	.00
		post-	20.93	0.174		
5	Assessment Strategies	pre-	10.68	0.501	-10.727	.00
		post-	20.93	0.174		
6	Authentic Materials	pre-	10.88	0.409	-9.054	.00
		post-	20.56	0.244		
7	Reflection	pre-	10.58	0.417	-15.158	.00
		post-	2.96	0.122		
Overall		pre	1.87	0.354	-150.032	.00
		post-	2.90	0.091		

• n=20, df=19

    Table 1 shows statistically significant differences (at α= 0.05) between the pre- and post- participants' instructional practices overall and in each of the seven domains, in favor of latter. Table 2 shows the means, standard deviations, percentages, and ranks of the participants' instructional practices after the treatment.

Table 2. Means, standard deviations, percentages, and ranks of the participants' post- treatment practices along the seven domains

No.	Domain	Mean	SD	%	Rank	Extent
1	Classroom Management	3.00	0.00	100	1	Excellent
7	Reflection	2.96	0.10	98.7	2	Excellent
3	Teaching Strategies	2.96	0.15	98.7	2	Excellent
4	Learning Strategies	2.93	0.20	97.7	4	Excellent
5	Assessment Strategies	2.93	0.20	97.7	5	Excellent
2	Language	2.88	0.16	96	6	Excellent
6	Authentic Materials	2.56	0.49	85.3	7	Excellent
	Overall	2.89	0.19	96.3		Excellent

Table 2 shows the means, standard deviations, percentages, and ranks of the participants' post-treatment practices along the seven domains. Even though participants' instructional practices overall and on all seven domains were affected to an *excellent* degree, c*lassroom management, reflection,* and *teaching strategies* were the top domains affected by the treatment whereas *authentic materials* was the least affected.

The findings suggest that the participants' instructional practices have substantially improved both overall and along the seven domains of the observation checklist (viz., *classroom management, reflection, teaching strategies, learning strategies, assessment strategies, language,* and *authentic materials*, respectively) as a result of the treatment.

These findings may be attributed to a number of factors, amongst which is the comprehensive nature of *Shaping the Way We Teach English*. This was further supplemented by a number of activities, based on the researchers' close contact with and frequent supervisory classroom visits, to better meet the participants' needs.

The effect of the treatment was further enhanced by the meticulous execution of *Shaping the Way We Teach English*. Video excerpts of classrooms from around the world were an integral part of each module. These illustrative videos of international best instructional practices engaged teachers in cooperative and collaborative work, which not only deepened their understanding of the instructional process but also enabled them to exchange experiences and work as a team.

Furthermore, the community of practice established by the treatment provided the participants with sustainable support that would outlast the confines of the treatment itself. The non-prescriptive, hands-on nature of the treatment may have catalyzed the participants' retention and subsequent application of learning, which has also affected their classroom performance. This has been fostered by opportunities for reflection and peer feedback during the treatment, especially with the rapport and intimacy which ensued between trainer and trainees on one hand

and the trainees themselves on the other before and during the training. This has potentially encouraged the teachers to participate more actively and, as revealed in the post-treatment observation, reflected positively on their instructional performance.

The second research question addressed potential gender effects on teachers' gains from the treatment. Means and standard deviations of the pre- and post-participants' instructional practices were calculated and Analysis of covariance (ANCOVA) used to determine whether there are any statistically significant differences (at $\alpha = 0.05$) in male and female participants' instructional practices, as shown in Table 3.

Table 3. Means, standard deviations, and adjusted means of the participants' post-treatment instructional practices by gender

Domain	Gender	n	Pre		Post		Adjusted Mean	SE
			Mean	SD	Mean	SD		
Classroom Management	Male	10	8.50	1.26	8.99	0.003	8.99	0.001
	Female	10	9.00	0.00	9.00	0.000	9.00	0.001
Language	Male	10	5.20	1.75	8.50	0.52	8.65	0.11
	Female	10	6.70	1.65	8.80	0.42	8.64	0.11
Teaching Strategies	Male	10	4.90	2.60	8.80	0.42	8.80	0.09
	Female	10	5.00	2.10	9.00	0.000	8.99	0.09
Learning Strategies	Male	10	3.90	1.37	9.00	0.000	9.13	0.13
	Female	10	5.40	2.01	8.60	0.69	8.46	0.13
Assessment Strategies	Male	10	5.30	2.11	8.60	0.69	8.56	0.13
	Female	10	4.80	1.54	9.00	0.000	9.03	0.13
Authentic Materials	Male	10	5.30	1.05	6.80	1.39	6.98	0.29
	Female	10	6.10	1.52	8.60	0.51	8.41	0.29
Reflection	Male	10	4.30	1.70	8.90	0.31	8.92	0.09
	Female	10	4.90	1.52	8.90	0.31	8.88	0.09
Overall	Male	10	37.40	10.76	59.59	2.98	59.99	0.53
	Female	10	41.90	9.98	61.90	1.72	61.50	0.53

Table 3 reveals observed differences between the male and female participants' instructional practices. To determine whether these differences are statistically significant (at $\alpha = 0.05$), One Way Analysis of Covariance (ANCOVA) was used to control the effect of pre- measurements, as shown in Table 4.

Table 4. ANCOVA of participants' post-treatment instructional practices by gender

Domain	Source	Sum of Squares	df	Mean Squares	f	Sig.	Partial Eta Squared
Classroom Management	Gender	6.32	1	6.32	1.218	0.28	0.06
	Error	8.82	17				
	Corrected Total	9.50	19	5.19			
Language	Gender	0.001	1	0.001	0.007	0.93	0.000
	Error	1.92	17				
	Corrected Total	4.55	19	0.11			
Teaching Strategies	Gender	0.19	1	0.19			
	Error	1.45	17		2.24	0.15	0.11
	Corrected Total	1.80	19	0.086			
Learning Strategies	Gender	1.85	1	1.85			
	Error	2.67	17		11.80	0.003*	0.41
	Corrected Total	5.20	19	0.15			
Assessment Strategies	Gender	1.10	1	1.10			
	Error	3.02	17		6.19	0.023*	0.26
	Corrected Total	5.20	19	0.17			
Authentic Materials	Gender	9.38	1	9.38			
	Error	13.67	17		11.66	0.003*	0.40
	Corrected Total	36.20	19	0.80			
Reflection	Way	0.008	1	0.008			
	Error	1.58	17		0.086	0.77	0.005
	Corrected Total	1.80	19	0.09			
Overall	Way	10.82	1	10.82	3.89	0.065	0.18
	Error	47.18	17				
	Corrected Total	133.72	19	2.77			

Table 4 shows statistically significant differences (at α=0.05) between male and female participants' instructional practices on post-treatment observations in the domains of *authentic materials* and *assessment strategies*, in favor of the

latter. However, significant differences (at α=0.05) between male and female participants' instructional practices on post-treatment observations in the domain of *learning strategies* were found in favor of male participants. No significant differences in the participants' overall performance and in the first, second, third, and seventh domains (viz., *classroom management, language, teaching strategies,* and *reflection*) were detected.

The analysis revealed that substantial gains by both male and female participants along the domains of *classroom management, teaching strategies, language,* and *reflection*, which improved not only their instructional practices but also their students' achievement and engagement in learning.

The significantly larger improvement in female participants' instructional practices on post-treatment observations in the domains of *authentic materials* and *assessment strategies* may suggest that male participants are less inclined to use innovative materials and assessment than their female counterparts. There is anecdotal evidence that female teachers are relatively more diligent than their male counterparts, which has been backed up by the observations as male participants seem more reluctant to use them compared to female participants who seemed to believe that authentic materials facilitate learning and make it more engaging to learners. Similarly, most male participants seemed to shy away from engaging in or assigning written work. They seemed less keen to assess learning than their female counterparts, most of whom were found not only to use different assessment tools but also to keep special records for that purpose.

Significant differences were also detected in the participants' instructional practices on post-treatment observations in the domain of *learning strategies* in favor of male participants. They were found to utilize *role play, questioning, language patterns, and self- monitoring and correction of their own speech* more frequently than their female counterparts.

5. Conclusions, Implications, and Recommendations for Further Research

The professional development program, *Shaping the Way We Teach English*, used in this research was found to develop the participants' practices along the domains of *classroom management, reflection, teaching strategies, learning strategies, assessment strategies, language,* and *authentic materials*. This is consistent with previous research findings (e.g., Giraldo, 2014; Hooker, 2006; Kennedy, 2016; King, 2012; Porter et al., 2000; Yarema, 2015) which provide evidence that professional development, for novice and experienced teachers alike, is a catalyst for improved instructional practices which potentially leads to improved student performance.

The current findings have given rise to several pedagogical implications, most important amongst which is that teacher professional development be made a priority for novice and experienced teachers alike, not only for improved

classroom practices but also for keeping abreast of the advancement in the field. This, in turn, may enable teachers to free themselves from the confines of traditional instruction into more innovative teaching and learning. Relevant to the findings of the current research, tailored professional development, which derives from the teachers' actual needs, may prove both most effective and more relevant, as a catalyst for teacher efficacy and improved student learning.

The findings have brought about several recommendations for teachers and researchers. Not only are teachers called upon to be proactive in seeking formal and informal professional development opportunities, such as *Shaping the Way We Teach English* under study, but they are also encouraged to make use of technology as a vast resource for professional development. The current findings have highlighted professional development as a catalyst for improved instructional practices, but more research is needed to arrive at more definitive conclusions.

References

Al Omari, T. A., & Bataineh, R. F. (2014). Jordanian EFL Teachers' Awareness and Incorporation of Multiple Intelligences into their Pedagogical Practices. *Open Access Library Journal, 1*(2), 1–22. DOI: 10.4236/oalib.1100327.

Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, New Jersey: Prentice Hall.

Bani Younis, R., & Bataineh, R.F. (2016). To Dictogloss or not to Dictogloss: Potential Effects on Jordanian EFL Learners' Writing Performance. *Apples – Journal of Applied Language Studies, 10*(2), 45–63. DOI: 10.17011/apples/urn.201610114330.

Bataineh, R. F., & Bani Younis, R. (2016). The Effect of Dictogloss on Jordanian EFL Teachers' Instructional Practices and Students' Writing Performance. *International Journal of Education and Training, 2*(1), 1-11.

Bataineh, R. F., Bataineh, R. F., & Thabet, S. S. (2011). Communicative Language Teaching in the Yemeni EFL Classroom: Embraced or Merely Lip-serviced? *Journal of Language Teaching and Research, 2*(4), 859-866.

Bharati, P., & Chalise, S. (2017). Teacher Development: Strategies and Perception. *The Saptagandaki Journal*, *8*, 69–78.

Bredson, P. (2002). *Professional Development of the University Teachers*. London: Flamer Press.

Broad, K., & Evans, M. (2006). *A Review of Literature on Professional Development Content and Delivery Modes for Experienced Teachers*. University of Toronto. Retrieved August 17, 2019, from http://www.oise.utoronto.ca/guestid/ite/UserFiles/File/AReview ofLiteratureonPD.pdf.

Darling-Hammond, L., & McLaughlin, M. (1995). Policies that Support Professional Development in an Era of Reform. *Phi Delta Kappan, 76*(8), 597–604.

Darling-Hammond, L., & Richardson, N. (2009). Teacher Learning: What Matters? *How Teachers Learn*, *66*(5), 46–53.

Fullan, M. (1995). *The Role of Principal in School Reform*. New York: Teachers College Press.

Garet, M. S., Porter, A. C., Desimone, M. L., Birman, B. F., & Suk Yoon, K. (2001). What Makes Professional Development Effective? Results from a National Sample of Teachers. *American Educational Research Journal*, *38*(4), 915–945. Retrieved September 13, 2019, from https://www.imoberg.com/files/Unit_D_ch._24_--_Garet_et_al._article.pdf.

Giraldo, F. (2014). The Impact of a Professional Development Program on English Language Teachers' Classroom Performance. *Teachers' Professional Development*, *16*(1), 63–76. Retrieved September 13, 2019, from http://www.scielo.org.co/scielo.php?script=sci_ arttext& pid=S1657-07902014000100005.

Hooker, M. (2006). Models and Best Practices in Teacher Professional Development. Retrieved September 13, 2019, from https://www.academia.edu/5521415/Models_and_Best_Practices-in_Teacher_Professional_Development.

Ingvarson, L., Meiers, M. & Beavis, A. (2005). Factors affecting the impact of professional development programs on teachers' knowledge, practice, student outcomes & efficacy. *Education Policy Analysis Archives 13*(10). Retrieved September 13, 2019, from http://epaa.asu.edu/epaa/v13n10.

Joshi, K. R. (2012). *English Language Teacher Development*. Kathmandu: Intellectuals' Book Palace.

Kennedy, M. M. (2016). How Does Professional Development Improve Teaching? *Review of Educational Research*, *86*(4). Retrieved September 13, 2019, from https://journals.sagepub.com/doi/abs/10.3102/0034654315626800.

King, F. (2012). *Developing and Sustaining Teachers' Professional Learning: A Case Study of Collaborative Professional Development*. Unpublished Master's Thesis, University of Lincoln, Lincoln (United Kingdom). Retrieved July 13, 2019, from http://doras.dcu.ie/22058/1/Thesis_-_Dr__Fiona_King_2012.pdf.

Mewborn, S., & Huberty, D. (2004). A Site-based Model for Professional Development in Mathematics at the Elementary School Level 2. *Pythagoras*, *59*, 2–7.

Mizell, H. (2010). *Why Professional Development Matters*. Oxford (Ohio): Learning Forward. Retrieved August 16, 2019. from https://learningforward.org/docs/default-source/pdf/why_pd_matters_web.pdf.

Opp-Beckman, L., & Klinghammer, S.J. (2006). *Shaping the Way We Teach English: Successful Practices Around the World (Instructor's manual)*. United States Department of State, Washington, DC: Office of English Language Programs. Retrieved October 1, 2017, from https://americanenglish.state.gov/files/ae/resource_files/shaping_the_way_we_teach_series_1.epub.

Oregon Department of Education (2014). Increasing the Effectiveness of Professional Learning Sections. Retrieved August 17, 2019, from https://www.oregon.gov/ode/schools-and districts/grants/ESEA/IIA/Documents/professional-learning.pdf.

Porter, A. C., Garet, M. S., Desimone, L., Birman, B. F., Suk Yoon, K. (2000). *Does Professional Development Change Teaching Practice? Results from a Three-Year Study*. Washington, DC: U.S. Department of Education.

Research Program of ELAN Institute for Teacher Training and Professional Development (2014). Advances in Theory and Practice of Teacher Professional Development. Retrieved August 16, 2019, from https://www.utwente.nl/en/ bms/elan/research/elan-research-program-2014-2018-july-2014.pdf.

Richards, J.C., & Farrell, T. S. C (2005). *Professional Development for Language Teachers: Strategies for Teacher Learning*. Cambridge: Cambridge University Press. Retrieved September 13, 2019, from https://www.researchgate.net/publication/249251998_Professional_Development_for_Language_Teachers.

Villegas-Reimers, E. (2003).*Teacher Professional Development: An International Review of Literature*. UNESCO: International Institute for Educational Planning.

Wallace, M.J. (1991). *Training Foreign Language Teachers*. Cambridge: Cambridge University Press.

Yarema, S.L. (2015). *The Impact of a Professional Development Program on Teachers' Practice and How Context Variables Influenced such Practice: A Case Study*. Unpublished Doctoral Dissertation, Wayne State University. Retrieved September 13, 2019, from https://pdfs.semanticscholar.org/e474/e4f49ce785a092b4be9c86c1f9c3d3 25a0f5.pdf.