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Enhancing Meaningful Learning in MRS120 Rotational Model

Suhaimi Zakaria@Othman, Norasykin Mohd Zaid,
Zaleha Abdullah, Hasnah Mohamed, Baharuddin Aris

Universiti Teknologi Malaysia

Studies on Blended Learning flourishingly have become unstoppable now. A lot of Model of Instruction venture on how to integrate technology with T&L especially involving Online Learning. In these studies, we will focus on Station Rotation Model which is one of the pedagogy approaches in delivering the content and inducing the Higher Order Thinking skill (HOTs) among the secondary student in Malaysia. Adoption and the hybridisation of this so call Blended Learning Model with Malaysian style of teaching were hoping critically assimilated the active learning environment in order to double up the generation thinking process among students. Meta-analysis on previous model will explain the component that will introduced to the newly enhanced Malaysian Instructional model which is called MRS120 Rotational Model. Theory on Meaningful Learning by Ausubel will be polished in this Model as discussed later in the paper.

Keywords: Rotational Model; Meaningful Learning; Blended Learning; HOTs; Higher Order Thinking; Thinking Skill

Introduction

The hybridisation of conventional or traditional elements with Online Learning approach in Teaching and Learning (T&L) are vigorously becoming such a trend nowadays as to induce the student engagement to the learning process. This model of 21st century education prime work has been classified by the Innosight Institute (cofounder by Clayton Christensen Institute) through the research made by Horn dan Staker (2011) to gather all information about this hybrid style of learning around the State of America in order to illustrate and distinguish the clear definition of so-called Blended Learning. This emerging pedagogical approach change the paradigm of the teacher to facilitate the students in controlling over their learning environment while the Online Learning tools (online collaboration, discussion boards, blogs, etc.),

technological tools (computers, cameras, digital white boards, etc.) and face to face instruction will be seamlessly incorporates within the process. In such way, the student would freely access without any boundaries to the instruction and learning resource using their own preference devices (Christensen, Horn, & Staker, 2013). Every Blended Leaning model has been analysed critically by the institute to discriminate the obvious difference for classification the continuum or the concentration of the Online Learning component.

Station Rotation Model

The type of Blended Learning Model which are represented by the Innosight Institute are Rotation Model, Flex Model, Self-Blended Model and Enriched-Virtual/Remote Model as shown in Figure 1 (Christensen *et al*., 2013). As for this research, we are focusing one of the blended learning pedagogical models which is Station Rotation Model where it is belong to the Rotational Model family consisted other model i.e. Lab-Rotation Model, Flipped-Classroom Model and Individual-Rotation Model. Compare to other models, Station Rotation can be combined more than two instructional methods (i.e. individual tutoring, group project, small group instruction, drill, etc.) including Online Learning in enhancing the student Self-Directed Learning and Social Network skill besides the essential knowledge gained from the teacher. Indirectly, the student are force to be active and cooperative in order to energised their higher level skill of thinking as they compete one another, thus creating a Student Centred Learning (SCL) environment. The differences between the approach, method and procedures or technique are represented graphically in Figure 2 (Anthony, 1963).

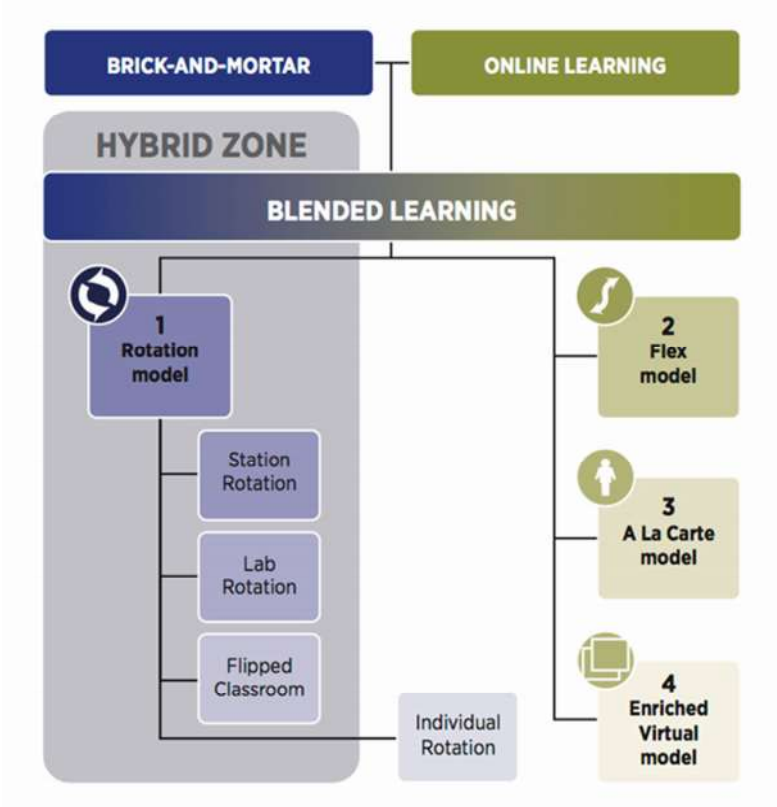

Figure 1 : Blended Learning Model (Christensen *et al.*, 2013)

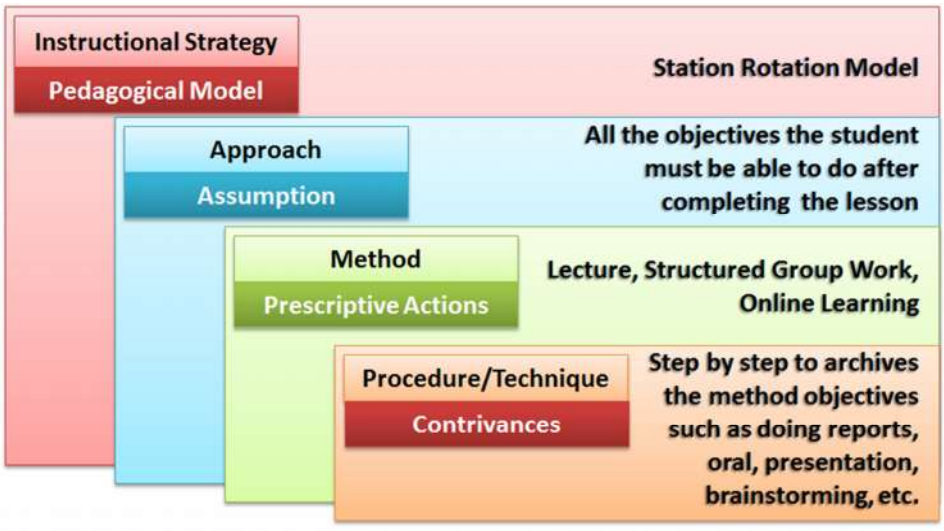

Figure 2 : Pedagogical/Instructional Strategy (Anthony, 1963)

Method of MRSP120 Evolution

Rotational Instructional Model actually was brought up by Dr Janet Allen and Dr Ted Hassel as a project of literacy on Orange County around 1994 till 1998 (Troute, 2009). Until today, this voluntary community based organisation spread wings to serve anyone in this Florida situated county by enhancing their reading, writing, numeracy and English literacy without any charges. Instructional design consisted of face-to-face activities, small-group computer-assisted tutoring, independent reading and small-group teacher instruction in order to engage the community with activities and minimise a drop out problems. The varieties of methods which is implemented in one shot of instruction gives space and opportunity to all ages of community in enhancing their interaction skill and helping them to suit their needs (Troute, 2009). The Orange County Rotational Model in Figure 3 shows outstanding performances in improving the reading skill among the student and the model was expanded to other field of study such as Science, Social Study and Mathematics. Surprisingly, the literacy model then is absorbed by a company called Scholastic to rehabilitate the articulation and reading ability of English among the primary and secondary school students thoroughly in all across counties in USA. It is called READ 180 model as illustrate in Figure 4 (Kim *et al.*, 2011). The model endlessly again inspires the Balanced Rotation Instruction Model (BRIM) (as shown in Figure 5) in contributing help for those student that has limited articulacy, listening and speaking skill in English. The difference is that it has another station where the students have an opportunity to use that segment to communicate with one another to get rid the oddities and speechless mode in chatting. It is also make the students experience the practicality in two way communication through experimentation of the vocabularies they have learned among them. Although most of the time

the model is always connected to language literacy but it can be used to improve other subject in school as Orange County Model does before this (Troute, 2009).

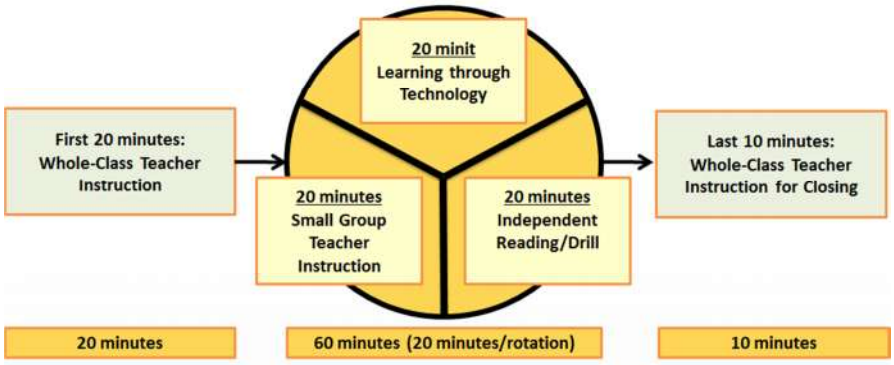

Figure 3: Orange County Instructional Model (Troute, 2009)

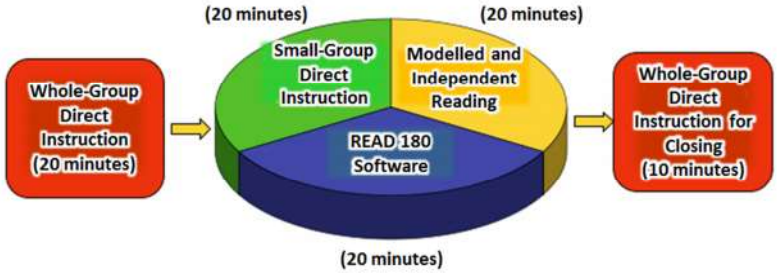

Figure 4 : READ 180 Instructional Model (Scholastic Canada, 2009)

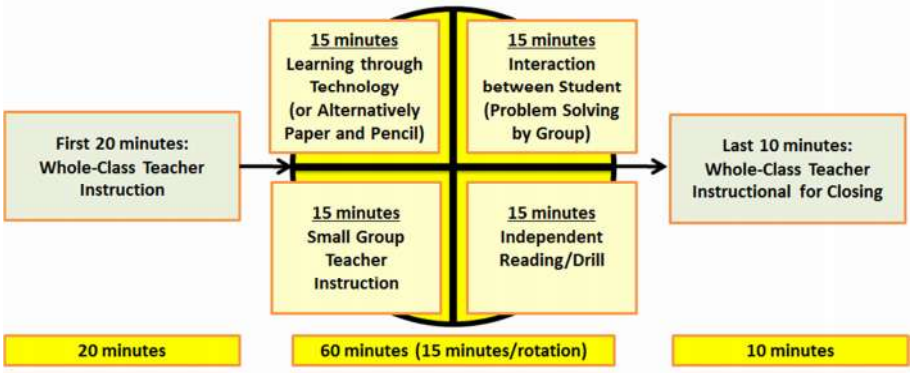

Figure 5 : Balanced Rotation Instructional Model (BRIM) (Troute, 2009)

The Clayton Christensen Institute then categories the model as one of Blended Learning model with a little change where Online Learning is included as the fundamentally must have element in the model. It is all about the Self Directed learning (Independent Learning) that under pinned the entire model in Blended Learning while the other elements remain unchanged that is small group teacher instructional and structured group work as illustrated in Figure 6. As for the purpose of adaptation for other subject, the segment in the rotation can be alternately be replaced with other method of T&L such as individual tutoring, independent reading, comprehensive practise and so on (Christensen *et al*., 2013).

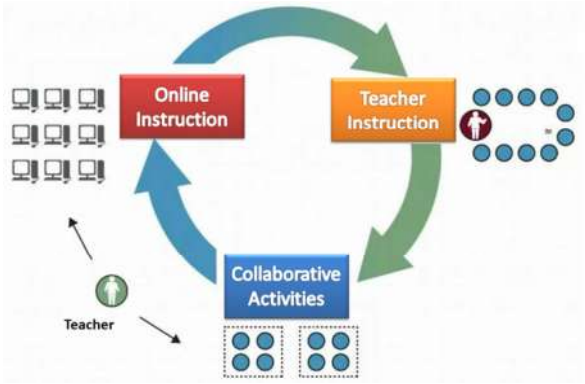

Figure 6 : Station Rotation Model (Staker dan Horn, 2012; Christensen *et al.*, 2013)

Rotation Schedule is used in arranging students' time and as the guidance to their respective activities as example shown in Figure 7 (Staker dan Horn, 2012). This model is selected by the researcher as the approach in helping Malaysian student to enhance their independent learning, motivation and engagement that would help them to cast HOTs in daily life. Furthermore, this bring an alternative to the teacher in adapting a new model in nurturing students' confidence to explore the flexibility in learning using every day used application technology at the same time remaining the old teaching style (Staker dan Horn, 2012).

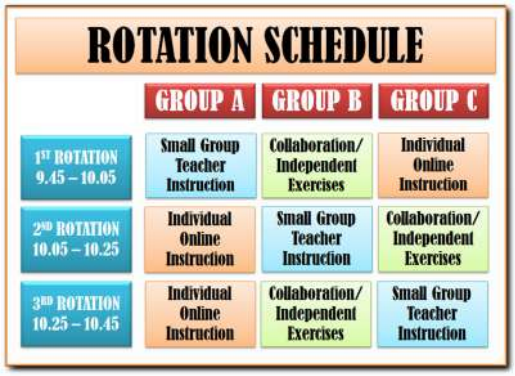

Figure 7 : Rotation Schedule

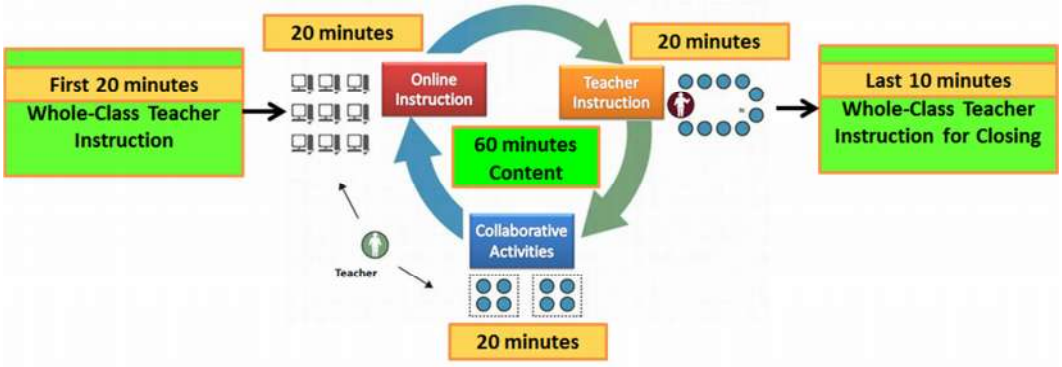

Figure 8 : 90 minutes Instructional Station Rotation Model (Christensen *et al.*, 2013)

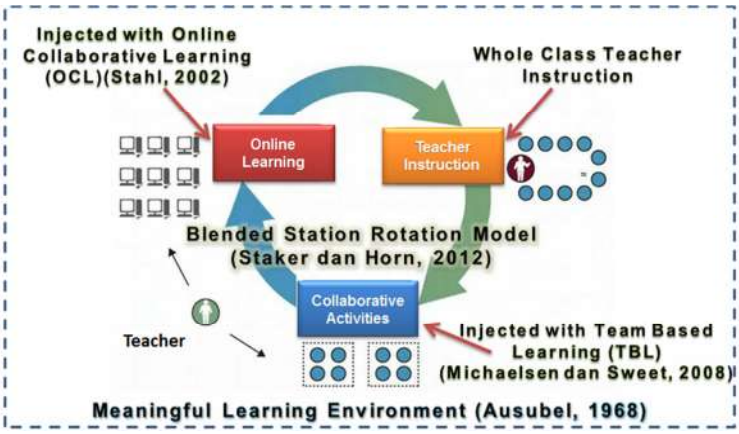

Figure 9 : Modification on 90 minutes Station Rotation Model

The usage of 90 minutes Instructional Block for Station Rotation Model as shown in Figure 8 are widely implemented in Elementary School and Middle School in America but rarely apply in High School because of the academic more focusing on the student future of further study (Arney, 2015). According to Kementerian Pendidikan Malaysia (1990), secondary school in Malaysia using instructional model for 40 minutes per period which consist of 5 minutes of induction set, 30 minutes instructional on content of subject and 5 minutes for closing. In order to assimilate and suited the education environment in Malaysia, the researcher have to merge the default 40 minutes instructional model with Station Rotation Model from the Clayton Christensen Institute. The segment inside the model will be also modified in order to integrate the Higher Order Thinking skill (HOTs) to empower the student mastery in Mathematics topics among the students before yielding the Instructional Station Rotation Model that will be suited the Malaysian Education system shown in Figure 9. The detailing of meta-analysis is simplified in Table 1 where the entire components are adapted and upgraded as the detailing will be explained in the result section of meta-analysis studies.

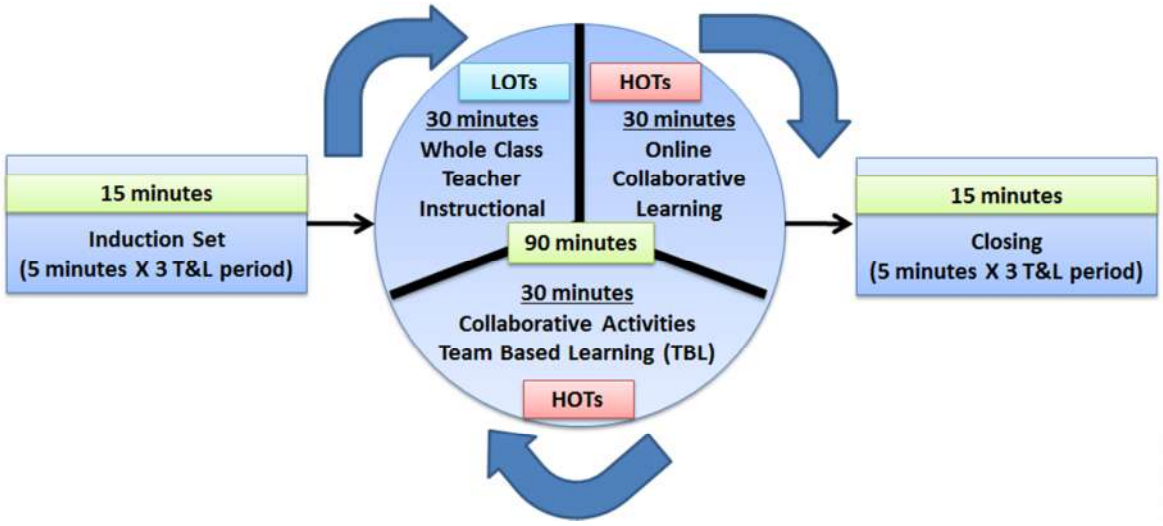

Figure 10 : 120 minutes Instructional Station Rotation Model (MRSP120)

Table 1 : Meta-Analysis of MRSP120 Evolution

Stesen Rotation Instructional Model	Induction Set	Rotation Number	Method of Learning (Content)	Closing
Orange County (Troute, 2009)	20 minutes	3	• Collaboration • Small Group Teacher Instruction • Online Learning **20 minutes X 3 = 60 minutes**	10 minutes
READ 180 (Scholastic Canada, 2009)	20 minutes	3	• Independent/Self-Directed Learning or Modelling • Small Group Teacher Instruction • READ 180 **20 minutes X 3 = 60 minutes**	10 minutes
Balanced Rotation (BRIM) (Troute, 2009)	20 minutes	4	• Collaboration • Small Group Teacher Instruction • Online Learning • Independent Reading/Drill **15 minutes X 4 = 60 minutes**	10 minutes
90 minutes (Christensen *et al.*, 2013)	20 minutes	3	• Collaboration • Small Group Teacher Instruction • Online Learning **20 minutes X 3 = 60 minutes**	10 minutes

Table 2 : Proposed Rotation Station Model for Malaysian Environment

Merging: Rotation Station + Duration T&L Structure of Malaysian Secondary School • Induction Set (5 min) • Content (30 min) • Closing (5 min)	15 minutes	3	• Team Based Learning (TBL) • Whole Class Teacher Instruction • Online Collaboration Learning (OCL)/ Computer-Supported Collaborative Learning (CSCL) **30 minutes X 3 = 90 minutes**	15 minutes
120 minutes Instructional Station Rotation Model (MRSP120) in Meaningful Learning Environment				

Results of the Meta-analysis

From the meta-analysis in Table 1, the researcher finally could emerge the 120 minutes Instructional Block of Station Rotation Model suited to Malaysian Environment as shown in Table 2 and Figure 10 called 120 minutes Instructional Station Rotation Model (MRSP120). The rotation of MRSP120 must be completed by using 3 periods (40 minutes/period) of instructional time in week duration but unnecessarily to be consecutive. The first segment is the teacher instruction to all students (whole class) where all the elementary knowledge (Lower Order Thinking skill - LOTs) about the topics will be gained by the student to firm out the foundation structure. Continuing the segment of rotation is the Online Collaborative Learning (OCL) where the student will not only use the blog as their platform to self-reflect the topic that have been learned but also they will share it among their friends to build a strong rapport and networks among them. Before entering the next segment of rotation, they will be given a task to do some independent research to get ready for the knowledge sharing activities in the Team Based Learning (TBL) in creating a product of presentation. The rotation segment will not be continuously in a same day but will be finish in a week time duration allowing the student to digest all the knowledge given including the HOTs training through OCL and TBL segments. Regularly, every segment will be include the induction set and closing set respectively without any compromise which has been allocate the time is for 5 minutes/set. The main difference in this Station Rotation Model compare to the native model is that the structured collaborative method embedded to the group work and online segment that was taken from Michaelsen & Sweet (2008) which promotes TBL and Stahl (2002) has discussed about the OCL a lot in his research. The environment of learning in Mathematics are based on Theory of Meaningful Learning by Ausubel (1968) as to initiate the greatness of promoting HOTs in this model.

Discussion on Meaningful Learning in MRSP120

In this model, Meaningful Learning occurred when the students are be able to apply what they have learned and more significantly would be able to retain the knowledge for their whole life. This SCL approach encourages the students to establish and strengthen the broad range of cognitive process (HOTs) in mastering the concept, procedure and metacognitive skill. Activities such as to do a plan in approaching given learning task, supervising on self-comprehension and do a progress evaluation when task are nearly to completion are some of the naturally metacognitive process that involve active thinking control over learning engagement process (Anderson *et al.*, 2001). When the student becoming active thinker, it's particularly promote students' understanding as the motivation blooming in the spirits (Zohar, 2004). From all the proven statement above, we can conclude that Higher Order Thinking skill (HOTs) could stimulate through meaningful learning to improve the students understanding in the subject or topic they learned. In the pedagogy of MRSP120, the activities that will give a high impact to the students' abilities are when they use inquiry-based learning in the group segment. This is where they have to use investigation approach actively in constructing their knowledge in better understanding the product for the presentation purposes. Therefore, the motivation engagement to think actively increases their responsibility for learning in that situation. The inquiry based learning situation may also include the technology such as simulation, online learning or computer-assisted investigation as a tool to explore the planning, procedure designation, tools/apparatus construction, hands-on experiment conduction, data interpretation, conclusions drawing and findings communication (Aksela, 2005). Student will automatically affect their attitude by the situation and retain as a habits as they further their life-long journey in learning.

The Information and Communication Technology (ICT) can be used as cognitive resource of artefacts to extend and amplify the cognitive of students' abilities in building up their meaningful environment for learning especially using simulation of real world situation software (Duan, 2012; Grabe & Grabe, 2013). This will make the students feel more confident when facing the real situation similar to the simulation situation drill (Howland *et al.*, 2013). In other words, the simulations give sense and meaningful learning to visualise them in facing real world situation.

Figure 11 shows the characteristics of meaningful learning which involve active, constructive, intentional, authentic and cooperative. All the characteristics are related to the model where the students are actively involved in social discourse to find support and coaching not only from the teacher but also from their friends (Grove & Lowery Bretz, 2012). When they cooperate with their friends, they increase deep processing thinking to construct their knowledge and comprehension especially when they do linkage with the authentic world situation until they find the solution. Motivation has been identified as an element that could enhance their intention to purely commit with their work in full hearted (Howland *et al.*, 2013).

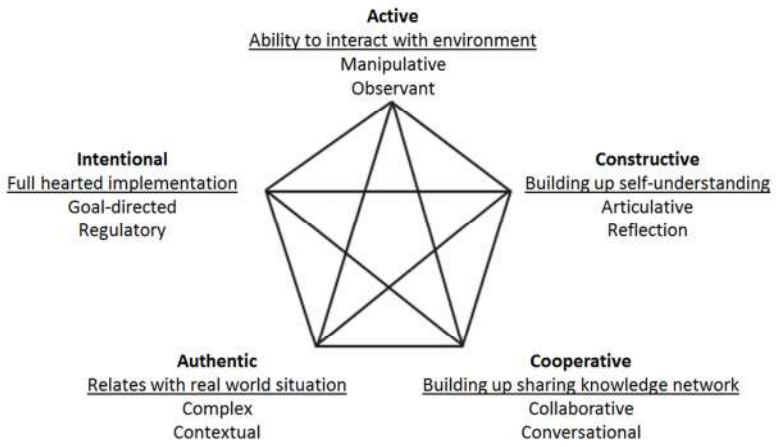

Figure 11 : Meaningful Learning (Howland *et al.*, 2013)

Conclusion

The MPRS120 is proposed as a model that could flourishing as one of instructional approach to promotes the HOTs elements among the Malaysian student. Besides, the integration of the method variation gives an active mood to the students in exploiting their inner potential to show off and building confidence among them. By experimenting all the knowledge delivered by their teacher, they well convey and retain the knowledge for the whole their life and make them more knowledgeable leader in future. As the model scrutinise the collaboration aspect of the student, it would be very good experience for them in learning to socialise and structure their own networks in building a good preparation for them to build rapport in their real world later. The flexibility of the model gives a vast amount of idea to the teacher to rearrange their method of teaching to assist the student ability in coping the knowledge obtains.

References

Aksela, M. (2005). *Supporting Meaningful Chemistry Learning and Higher-order Thinking through Computer-Assisted Inquiry : A Design Research Approach*.

Anderson, L. W., Krathwohl, D. R., Airsian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., … Wittrock, M. C. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. *Theory Into Practice* (Vol. Complete e). Longman. doi:10.1207/s15430421tip4104_2

Anthony, E. M. (1963). Approach, Method and Technique. English language teaching, *17*(2), 63–67.

Arney, L. (2015). *Go Blended!: A Handbook for Blending Technology in Schools*. San Francisco: John Wiley & Sons.

Ausubel, D. P. (1968). Facilitation Meaningful Verbal Learning in the Classroom. *The Arithmetic Teacher*, *15*(2), 126–132. Retrieved from http://www.jstor.org/stable/41187349

Christensen, C., Horn, M., & Staker, H. (2013). Is K-12 blended learning disruptive: An introduction of the theory of hybrids. *Clayton Christensen Institute (May 2013)*, 1–48. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Is+K-12+Blended+Learning+Disruptive+?+An+introduction+of+the+theory+of+hybrids#0

Duan, J. (2012). Research about technology enhanced higher-order thinking. In *ICCSE 2012 - Proceedings of 2012 7th International Conference on Computer Science and Education* (pp. 687–689). doi:10.1109/ICCSE.2012.6295167

Grabe, M., & Grabe, C. (2013). *Integrating Technology for Meaningful Learning* (6th ed.). Houghton Mifflin Company.

Grove, N. P., & Lowery Bretz, S. (2012). A continuum of learning: from rote memorization to meaningful learning in organic chemistry. *Chemistry Education Research and Practice*, *13*, 201. doi:10.1039/c1rp90069b

Horn, M. B., & Staker, H. (2011). *The rise ok K-12 Blended Learning. Innosight Institute Retrieved on September* (Vol. 21). Retrieved from http://www.innosightinstitute.org/media-room/publications/education-publications/the-rise-of-k-12-blended-learning/

Howland, J. L., Jonassen, D. H., & Marra, R. M. (2013). *Meaningful Learning with Technology* (4th ed.). Boston, MA: Pearson Education Limited.

Kementerian Pendidikan Malaysia. (1990). Surat Pekeliling Ikhtisas Bil. 8/1990 : Sukatan Pelajaran dan Peruntukan Masa untuk Mata-mata Pelajaran Program Kurikulum Bersepadu Sekolah Menengah (KBSM) bagi Sekolah Menengah Mulai Tahun 1992. Kuala Lumpur: Kementerian Pendidikan Malaysia.

Kim, J. S., Capotosto, L., Hartry, A., & Fitzgerald, R. (2011). Can a Mixed-Method Literacy Intervention Improve the Reading Achievement of Low-Performing Elementary School Students in an After-School Program?: Results From a Randomized Controlled Trial of READ 180 Enterprise. *Educational Evaluation and Policy Analysis*, *33*, 183–201. doi:10.3102/0162373711399148

Michaelsen, L. K., & Sweet, M. (2008). The Essential Elements of Team-Based Learning. *Issue New Directions for Teaching and Learning*, *2008*, 7 – 27. doi:10.1002/tl

Scholastic Canada Ltd. (2009). Read 180. *Scholastic Education*. Retrieved January 30, 2015, from http://education.scholastic.ca/category/READ_180

Stahl, G. (2002). Proceedings of the Conference on Computer Support for Collaborative Learning: Foundations for a CSCL Community: Foundations for a CSCL Community. *CSCL '02: Proceedings of the Conference on Computer Support for Collaborative Learning: Foundations for a CSCL Community*. Retrieved from http://portal.acm.org/citation.cfm?id=1658616

Staker, B. H., & Horn, M. B. (2012). Classifying K – 12 Blended learning. *Learning*, 22.

Staker, H., & Horn, M. (2012). Classifying K–12 Blended Learning. *Innosight Institute*. doi:10.1007/s10639-007-9037-5

Troute, L. R. (2009). *Balanced Rotational Instructional Model (BRIM)*. Florida: Department of Multicultural Education.

Zohar, A. (2004). Elements of Teachers ' Pedagogical Knowledge Regarding Instruction of Higher Order Thinking. *Journal of Science Teacher Education*, *15*, 293–312. doi:10.1023/B:JSTE.0000048332.39591.e3