Penerokaan Dan Pembangunan Kerangka Pembelajaran Aktif Berasaskan Teknologi Bagi Pelajar TVET

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Abstrak: Buku ini merupakan sebuah kajian berkaitan pendidikan Teknologi dalam meningkatkan proses Pengajaran dan Pembelajaran (PdP) pelajar TVET. Melalui buku ini pelbagai kaedah pembelajaran yang dapat di gunakan dalam membantu meningkatkan kaedah Pengajaran dan Pembelajaran (PdP) pelajar ke arah penguasaan teknologi yang lebih berkesan. Bermula dengan latar belakang pembelajaran aktif dan pembelajaran teknologi dalam meningkatkan sistem pendidikan TVET ke arah pendidikan yang selaras dengan perkembangan Industri 4.o. Usaha dilakukan bagi menghasilkan sebuah buku ilmiah berkaitan kaedah pembelajaran yang berkesan untuk dipraktikkan dipraktikkan dalam bidang TVET bagi membina kemahiran kebolehkerjaan pelajar dalam persekitaran berteknologi tinggi. Pembelajaran Aktif Berasaskan Teknologi (PABT) adalah satu penyelidikan yang amat menarik untuk dibuatkan kajian lanjut. Di mana topik penyelidikan pembelajaran aktif yang telah lama wujud sejak berabad dalam bidang pendidikan yang sering disuntik dengan pelbagai pembaharuan dari segi teknologi dan inovasi. Perkara ini menunjukkan konsep PABT adalah merupakan sebagai platform pembelajaran yang menggabungkan pelbagai kaedah belajar secara berkumpulan dalam mengaplikasikan teknologi bagi meningkatkan keberkesanan pengajaran di dalam kelas. Selain itu, konsep PABT ini memfokuskan kaedah PdP yang menggunakan teknologi dalam menghasilkan pembelajaran aktif bagi meningkatkan pemahaman dalam membentuk kualiti dengan memberi peluang kepada pelajar TVET untuk membina pengalaman sebenar bagi dipraktikkan dalam pekerjaan kelak.

Kata kunci: Aktif, kerangka TVET, pembangunan, teknologi

Penerokaan dan Pembangunan

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Isi Kandungan

BAB 5 RUMUSAN, PERBINCANGAN DAN CADANGAN

Senarai Singkatan

PABT	Pembelajaran Aktif Berasaskan Teknologi
TMK	Teknologi Maklumat dan Komunikasi
PdP	Pengajaran dan Pembelajaran
TVET	Pendidikan dan Latihan Teknik dan Vokasional
OECD	Organization for Economic Co-operation and Development
MTUN	Malaysian Technical University Network
UTHM	Universiti Tun Hussein Onn Malaysia
UMP	Universiti Malaysia Pahang
UTeM	Universiti Teknikal Malaysia Melaka
UniMaP	Universiti Malaysia Perlis
UNESCO	United Nations Educational, Scientific and Cultural Organization
KPM	Kementerian Pendidikan Malaysia
ART	Alumni Research Team
IPT	Institusi Pendidikan Tinggi
DePAN	Dasar e-Pembelajaran Negara
ABBM	Alat Bahan Bantu Mengajar
CEDEFOP	European Centre for the Development of Vocational Training
MEIPTA	Majlis e-Pembelajaran IPTA Malaysia
PSPTN	Pelan Strategik Pengajian Tinggi Negara
TEAL	Technology Enabled/Enhanced Active Learning
PPPM (PT)	Pelan Pembangunan Pendidikan Malaysia 2015-2025 (Pendidikan Tinggi)
KPTM	Kementerian Pendidikan Tinggi Malaysia
MOOCs	Massive Open Online Courses
AUTOCAD	Auto Commercial Computer Aided Design
ICT	Information and Communication Technologies
KKM	Kerangka Kelayakan Malaysia
MQF	Malaysian Qualifications Framework
IPTA	Institut Pengajian Tinggi Awam
IPTS	Institut Pengajian Tinggi Swasta
CLeaR Room	Collaborative Learning Room
BYOD	Bring your own Device
FOC	Full Online Classroom
GLOBAL	Pusat Pembelajaran Atas Talian Tahap Global
e-Lab	Experimental System Online
KALAM E-Learning	Knowledge and Learning Management System
VSD	Video Streaming on Demand
ISTE	International Society for Technology in Education

NETS	National Educational Technology Standards
TPACK	Technological Pedagogical Content Knowledge
TK	Technological Knowledge
PK	Pedagogical Knowledge
CK	Content Knowledge
MIT	Massachusetts Institute of Technology
CCU	National Chung Cheng University
IUSB	Indiana University South Bend
NCSU	North Carolina State University
SUTD	Singapore University of Technology and Design
LCD	Liquid Crystal Display
WEF	World Economy Forum
AUN	ASEAN University Network
PCA	Principal Component Analysis
PTMEA CORR	Point Measure Correlation
PhD	Doctor of Philosophy
Outfit-MNSQ	Outfit Mean-Square
ZSTD	Standardized Z Values

Prakata

Alhamdulillah, bersyukur ke hadrat Allah SWT kerana dengan limpah kurnia-Nya kami dapat menghasilkan sebuah buku ilmiah yang diberikan tajuk Penerokaan Dan Pembangunan Kerangka Konsep Pembelajaran Aktif Berasaskan Teknologi (PABT) bagi Pelajar TVET. Buku ini merupakan sebuah kajian berkaitan pendidikan Teknologi dalam meningkatkan proses Pengajaran dan Pembelajaran (PdP) pelajar TVET. Melalui buku ini pelbagai kaedah pembelajaran yang dapat di gunakan dalam membantu meningkatkan kaedah Pengajaran dan Pembelajaran (PdP) pelajar ke arah penguasaan teknologi yang lebih berkesan.

Bermula dengan latar belakang pembelajaran aktif dan pembelajaran teknologi dalam meningkatkan sistem pendidikan TVET ke arah pendidikan yang selaras dengan perkembangan Industri 4.0. Usaha dilakukan bagi menghasilkan sebuah buku ilmiah berkaitan kaedah pembelajaran yang berkesan untuk dipraktikkan dalam bidang TVET bagi membina kemahiran kebolehkerjaan pelajar dalam persekitaran berteknologi tinggi.

Pembelajaran Aktif Berasaskan Teknologi (PABT) adalah satu penyelidikan yang amat menarik untuk dibuatkan kajian lanjut. Di mana topik penyelidikan pembelajaran aktif yang telah lama wujud sejak berabad dalam bidang pendidikan yang sering disuntik dengan pelbagai pembaharuan dari segi teknologi dan inovasi. Perkara ini menunjukkan konsep PABT adalah merupakan sebagai platform pembelajaran yang menggabungkan pelbagai kaedah belajar secara berkumpulan dalam mengaplikasikan teknologi bagi meningkatkan keberkesanan pengajaran di dalam kelas. Selain itu, konsep PABT ini memfokuskan kaedah PdP yang menggunakan teknologi dalam menghasilkan pembelajaran aktif bagi meningkatkan pemahaman dalam membentuk kualiti dengan memberi peluang kepada pelajar TVET untuk membina pengalaman sebenar bagi dipraktikkan dalam pekerjaan kelak.

Semoga dengan adanya perkongsian ilmiah berkaitan pembangunan kerangka konsep PABT ini dapat memberikan sumbangan yang signifikan kepada pihak pendidikan untuk dijadikan rujukan bagi meningkatkan kualiti pelajar TVET melalui konsep PABT dalam melahirkan tenaga kerja mahir yang berteknologi tinggi.

BAB 1

Pendahuluan

1.1 Pengenalan

Pembelajaran Aktif Berasaskan Teknologi (PABT) ditakrifkan sebagai format pembelajaran baru yang menggabungkan tiga konsep yang melibatkan penyampaian kandungan pelajaran daripada pensyarah dalam kuliah, simulasi, pengalaman hands on pelajar dengan penggunaan peralatan teknologi inovasi (Belcher, 2001; Belcher, 2005, Breslow, 2010; Cinganotto, Panzavolta, Garista, Guasti & Dourmashkin, 2016). Peralatan teknologi inovasi yang digunakan dalam PABT adalah terdiri daripada penggunaan teknologi multimedia, Teknologi Maklumat dan Komunikasi (TMK), alatan elektronik, digital, perisian web internet, alatan saintifik, teknologi komputer dan mesin tangan yang dapat membantu mewujudkan Pengajaran dan Pembelajaran (PdP) yang aktif (Long, Logan, Cummins & Waugh, 2016).

Ini adalah penting bagi membina pengetahuan dan pengalaman pelajar untuk membentuk persekitaran pembelajaran yang praktikal dalam melaksanakan pembelajaran secara simulasi dan visualisasi yang bertujuan memudahkan pelajar untuk lebih memahami isi pelajaran yang dipelajari (Dori & Belcher, 2005; Pirker, 2013). Pengaplikasian format PABT ini adalah berdasarkan gabungan pedagogi pembelajaran aktif dengan aplikasi teknologi bilik kuliah yang perlu disediakan dalam pembelajaran bagi mewujudkan persekitaran aktif yang bermanfaat dari teknologi untuk meningkatkan kefahaman pelajar terhadap konsep pelajaran dan membina kemahiran berkaitan pekerjaan (Dori, Breslow & Belcher, 2007; Gebre, Saroyan & Bracewell, 2014; Chiu, 2016; Hamilton, 2017).

Selain itu, pembelajaran ini juga dapat membantu institusi pendidikan Malaysia dalam melahirkan pelajar berkualiti yang mempunyai pengetahuan teknologi yang tinggi dalam memenuhi tenaga kerja profesional, mahir dan separa mahir di industri yang secara tidak langsung memberikan cabaran yang hebat kepada perubahan pendidikan negara terutamanya dalam Pendidikan dan Latihan Teknik dan Vokasional (TVET) (Bakar, Hamzah & Udin, 2011; Rasul, Ashari, Azman & Abdul Rauf, 2015). Malahan menurut Esa dan Rahman (2014), TVET adalah sistem pendidikan yang menitikberatkan pembelajaran yang berasaskan kemahiran, pengetahuan dan teknologi dalam membentuk graduan yang berkualiti bagi membina kemahiran mengendalikan teknologi global yang semakin berkembang bagi membentuk negara maju ke arah ekonomi berpendapatan tinggi.

BAB 2

Kajian Literatur

2.1 Pengenalan

Bab ini mengandungi kajian lepas yang berkaitan dengan pendekatan yang digunakan dalam mewujudkan pembelajaran aktif bagi menyokong pelaksanaan kajian. Berdasarkan beberapa bahan kajian terdahulu, dapat dirumuskan kepada beberapa bahagian dalam kajian literatur iaitu berkaitan pendidikan TVET, teori-teori pembelajaran dan perkara-perkara yang membantu pelaksanaan berkaitan Pembelajaran Aktif Berasaskan Teknologi (PABT) dalam meningkatkan pengetahuan, pemahaman, kemahiran dan pengalaman graduan TVET kejuruteraan.

2.2 Pendidikan dan Latihan Teknik dan Vokasional

Dalam era globalisasi ini, evolusi teknologi yang pesat dalam sektor pendidikan di negara ini mula berubah secara dinamis bagi mencapai keperluan negara global sehingga timbul pelbagai isu berkaitan pembentukan tenaga kerja mahir yang berkelayakan dan berkemahiran dalam kalangan graduan lepasan Institusi Pengajian Tinggi (IPT) (Chang *et al.,* 2009; Faiz, 2011; Ismail *et al.,* 2018). Terutamanya dalam pendidikan TVET yang merupakan institusi yang bertanggungjawab membentuk graduan yang berpotensi tinggi dalam pelbagai kemahiran teknologi bagi menjadi pekerja profesional kelak (Bello *et al.,* 2013, UNESCO, 2016; KPTM, 2018). Perkara ini berlaku dalam pendidikan masa kini yang memerlukan pelaksanaan pembelajaran teknologi bagi melahirkan graduan TVET yang mahir dan berpotensi menjadi tenaga kerja teknikal yang dapat memenuhi keperluan industri (Saud *et al.,* 2011; Kasa, 2016; Senteni, 2017).

Pendidikan TVET turut menyediakan program kurikulum yang berteknologi bagi membantu pelajar supaya mahir dalam menggunakan alatan tangan bagi meningkatkan kemahiran *hands on* dalam mengendalikan pembelajaran ICT yang mencabar supaya dapat membina pengalaman dan pendedahan awal keadaan sebenar apabila bekerja kelak (Aliyu, 2012; Ahmad *et al.,* 2015; KPTM, 2017). Matlamat TVET adalah untuk membentuk pelajar yang berkemahiran dan berkompetensi tinggi untuk berjaya dalam kerjaya, pendidikan, kerja praktikal dan kehidupan bagi meningkatkan tahap kebolehpasaraan dalam diri graduan setelah tamat belajar (Manitoba, 2013; Muhamad, 2016; Ashraf *et al.,* 2018).

BAB 3

Metodologi

3.1 Pengenalan

Bab ini membincangkan metodologi penyelidikan dalam kajian bagi menjelaskan tentang kaedah mereka bentuk bagaimana kajian hendak dilaksanakan bagi memperoleh data untuk dianalisis menggunakan kaedah yang bersesuaian. Metodologi kajian bertujuan untuk merancang aktiviti oleh penyelidik bagi memperoleh jawapan kepada objektif berdasarkan persoalan kajian yang telah ditetapkan (Howell, 1999; Idris, 2010; Weber, 2017). Aspek yang diterangkan dalam bab ini adalah berkaitan reka bentuk kajian, kerangka operasi dan proses keseluruhan kajian iaitu lokasi, populasi dan sampel, instrumen, kesahan dan kebolehpercayaan, prosedur pengumpulan data dan kaedah menganalisis data. Setiap aspek akan diterangkan dengan jelas bagi memberi gambaran keseluruhan kajian yang hendak dilaksanakan. Kaedah penyelidikan yang bersesuaian dan tepat adalah penting dalam menghasilkan sebuah kajian yang berkualiti serta terancang mengikut prosedur atau susunan yang terperinci dan teratur.

3.2 Reka Bentuk Kajian

Reka bentuk kajian digunakan adalah untuk membuat perancangan tindakan keseluruhan yang terperinci dalam melaksanakan penyelidikan ini (Linacre, 2007). Menurut Chua (2015), reka bentuk kajian mencerminkan pelaksanaan proses dalam sesuatu penyelidikan, di mana reka bentuk kajian meliputi sumber maklumat yang perlu dikumpul, perkaitan sumber maklumat dengan kajian yang ingin dijalankan serta kaedah yang digunakan untuk memproses maklumat kajian. Dalam kajian ini penyelidik memilih untuk menggunakan reka bentuk kaedah tinjauan yang menggabungkan dua kaedah iaitu kualitatif dan kuantitatif. Kaedah gabungan ini adalah merupakan prosedur yang digunakan untuk mengumpul dan menganalisis data dalam kajian ini (Tashakkori & Teddlie 2003; Clarke & Creswell, 2011). Justifikasi pemilihan kaedah bagi kajian ini adalah untuk memperoleh dapatan domain melalui analisis dokumen dan elemen-elemen melalui temubual pakar melalui kaedah kualitatif dan seterusnya pemeriksaan dan pengesahan item bagi mengukur kesesuaian elemen-elemen Pembelajaran Aktif Berasaskan Teknologi (PABT) yang telah dikenal pasti dengan kaedah kuantitatif.

BAB 4

Dapatan Kajian

4.1 Pengenalan

Bab ini akan menghuraikan hasil dapatan kajian setelah proses penganalisisan data dijalankan. Penganalisisan data dalam kajian ini merangkumi kepada dua fasa: (i) Fasa pertama analisis berkaitan data kualitatif bagi menentukan domain dan elemen-elemen yang diperlukan dalam Pembelajaran Aktif Berasaskan Teknologi (PABT) yang diperoleh daripada analisis dokumen dan temubual serta konsensus kesepakatan persetujuan pakar melalui nilai pekali *Fleiss's Kappa;* (ii) Fasa kedua analisis berkaitan data kuantitatif untuk memperoleh dapatan data menggunakan soal selidik menggunakan perisian *Winstep V3.69.1.11* bagi menjawab persoalan kajian berdasarkan nilai min skor dan min ukuran serta Analisis Komponen Utama (*Principal Component Analysis, PCA*) untuk menguji dan mengesahkan kerangka konsep yang dibangunkan. Bab ini adalah untuk melaporkan keseluruhan dapatan kajian yang telah dijalankan bagi menjawab semua persoalan kajian secara kualitatif dan kuantitatif dengan jelas dan terperinci.

4.2 Analisis Dapatan Data Kualitatif

Bahagian ini menghuraikan hasil dapatan data berkaitan analisis dokumen dan analisis tema bagi fasa pertama analisis untuk data kualitatif. Bahagian ini terbahagi kepada dua peringkat bagi memperoleh dapatan kajian iaitu (i) Perlu membuat analisis untuk mengenal pasti domain kajian berdasarkan teori, gaya, model dan kajian lepas bagi menentukan elemen-elemen PABT yang diperlukan dalam kajian; (ii) Perlu menjalankan sesi temubual bersama panel pakar bagi memperoleh domain dan elemen-elemen yang diperlukan dan seterusnya mendapatkan konsensus kesepakatan persetujuan panel pakar bagi mendapatkan elemen-elemen PABT bagi setiap domain yang terlibat dalam kajian ini.

BAB 5

Rumusan, Perbincangan dan Cadangan

5.1 Pengenalan

Bab ini akan menghuraikan berkaitan rumusan dan perbincangan hasil dapatan berdasarkan penganalisisan data yang telah dijalankan bagi menjawab persoalan-persoalan kajian. Malahan dalam bab ini turut membincangkan mengenai bagaimana hasil dapatan yang diperoleh dapat menyumbang kepada bidang pendidikan di institusi MTUN dan juga implikasi kajian. Selain itu, kesimpulan dan cadangan lanjutan bagi kajian ini turut dinyatakan sebagai garis panduan untuk kajian seterusnya yang berkaitan dengan skop kajian ini.

5.2 Rumusan Dapatan Kajian

Hasil dapatan kajian ini adalah untuk menentukan elemen-elemen yang diperlukan berdasarkan domain yang telah dikenal pasti dalam mewujudkan Pembelajaran Aktif Berasaskan Teknologi (PABT) bagi meningkatkan pemahaman pelajar dalam bidang yang diceburi untuk menghasilkan graduan berkualiti dan mempunyai kebolehkerjaan yang tinggi. Selain itu, pembentukan kerangka konsep PABT ini adalah untuk di jadikan panduan dalam bidang pendidikan. Bagi memperoleh hasil dapatan, kajian ini telah menggunakan reka bentuk kaedah campuran penerokaan berjujukan (*Exploratory Sequential Mixed Method Design*) dalam menyelesaikan persoalan-persoalan yang perlu di jawab. Rumusan kajian ini terbahagi kepada dua fasa iaitu fasa pertama adalah kualitatif bagi menjawab persoalan pertama dan kedua. Manakala fasa kedua adalah kuantitatif bagi menjawab persoalan ketiga dan keempat.

5.2.1 Rumusan Dapatan Fasa Pertama Kajian (Kaedah Kualitatif)

Pada fasa pertama, hasil dapatan kualitatif adalah untuk menjawab persoalan pertama dan persoalan kedua kajian dalam mengenal pasti domain dan menentukan elemen-elemen yang diperlukan bagi mewujudkan persekitaran PABT untuk meningkatkan pemahaman pelajar dalam bidang yang di ceburi supaya dapat menghasilkan graduan berkualiti dan kebolehkerjaan tinggi. Pada peringkat permulaan kajian ini proses penentuan domain telah dilaksanakan melalui kaedah analisis dokumen daripada

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