

BAB V

SIMPULAN, IMPLIKASI DAN REKOMENDASI

5.1. Simpulan

Berdasarkan temuan hasil penelitian ini, dapat disimpulkan bahwa kegiatan argumentasi dalam praktikum inkuiri dapat digunakan untuk mengembangkan keterampilan argumentasi ilmiah sekaligus juga keterampilan berpikir kritis. Analisis keterampilan argumentasi ilmiah dan keterampilan berpikir kritis pada penelitian ini akan disimpulkan sesuai dengan pertanyaan penelitian.

Pertama, keterampilan argumentasi ilmiah mahasiswa calon guru biologi meningkat secara signifikan setelah mengikuti kegiatan ABILA. Dengan demikian dapat dikatakan bahwa penerapan praktikum ABILA berkontribusi pada peningkatan KAI mahasiswa yang berarti mahasiswa mulai mampu menghasilkan argumen dengan berlatih selama mengikuti kegiatan ABILA. Peningkatan KAI yang terpengaruh paling tinggi adalah aspek data yaitu bahwa mahasiswa mampu menggunakan data yang dimiliki sebagai nukti untuk mendukung klaim yang diajukan. Selanjutnya peningkatan yang paling tinggi kedua yaitu pada aspek *warrant* yaitu kemampuan mahasiswa untuk memberikan penjelasan hubungan data dengan klaim dengan selisih skor rata-rata yang paling tinggi. Kegiatan praktikum ABILA ini dirasakan sebagai wahana untuk belajar kegiatan lab inkuiri sekaligus belajar berargumentasi ilmiah. Sementara itu, keterampilan argumentasi ilmiah yang ditampilkan mahasiswa selama mengikuti kegiatan ABILA juga terlihat semakin meningkat. Peningkatan ini dapat dilihat dari penilaian produk argumen mahasiswa selama kegiatan ABILA yaitu semakin banyaknya mahasiswa yang menghasilkan argumen pada level yang lebih tinggi dan semakin sedikitnya mahasiswa yang menghasilkan argumen pada level yang lebih rendah. Dengan demikian dapat dikatakan bahwa kegiatan praktikum ABILA ini membantu mahasiswa terlibat dan berlatih argumentasi dan meningkatkan kualitas argumentasi yang dihasilkan. Perkembangan struktur argumen mahasiswa yang dihasilkan selama kegiatan ABILA juga semakin lengkap seiring dengan berjalannya kegiatan praktikum, semakin banyaknya muncul komponen-komponen argumen dalam setiap topik hingga pada topik terakhir dihasilkan argumen-

argumen dengan komponen yang lengkap, yaitu terdiri atas klaim, data, *warrant*, *backing*, *rebuttal* dan *qualifier*. Penelitian ini juga menemukan adanya 5 (lima) macam pola profil perkembangan KAI mahasiswa selama penerapan kegiatan ABILA. Kelima profil tersebut adalah perkembangan KAI luar biasa (*excellent*), unggul (*superior*), cukup (*sufficient*), lumayan (*tolerable*) dan tidak berkembang. Perbedaan pola perkembangan ini dipengaruhi oleh perbedaan partisipasi mahasiswa selama kegiatan ABILA, familiaritas mahasiswa pada konteks masalah yang didiskusikan dan kesungguhan mahasiswa dalam menghasilkan semua bentuk argumen baik dalam kelompok maupun individu pada setiap langkah kegiatan ABILA.

Kedua, keterampilan berpikir kritis mahasiswa calon guru biologi dalam penelitian ini juga mengalami peningkatan setelah mengikuti kegiatan ABILA pada praktikum mikrobiologi. Peningkatan KBK yang paling signifikan adalah pada sub keterampilan mengembangkan dan mempertahankan suatu posisi dalam suatu isu dengan cara menganalisis, mengevaluasi dan menghasilkan penjelasan-penjelasan. Dengan demikian, kegiatan argumentasi selama kegiatan lab inkuiri membantu mahasiswa dalam meningkatkan kemampuan mengembangkan dan mempertahankan suatu posisi dalam suatu isu yang dengan demikian membantu mahasiswa menguasai keterampilan berpikir kritis.

Ketiga, Penelitian ini juga memperlihatkan korelasi yang signifikan dan positif antara KAI dan KBK yang berarti bahwa semakin tinggi KAI mahasiswa maka semakin tinggi pula KBKnya. Hasil ini memperkuat hasil penelitian yang menunjukkan hubungan yang positif antara argumentasi dengan berpikir kritis. Dengan demikian, kedua keterampilan ini dapat dikembangkan secara bersama-sama dalam pembelajaran sains terutama dalam kegiatan praktikum yang menjadi ciri khas pembelajaran sains.

5.2. Implikasi

Berdasarkan hasil penelitian yang telah diuraikan pada bagian sebelumnya, terdapat beberapa implikasi yang dapat diajukan dari penelitian ini. Pertama, kegiatan *Argument-Based Inquiry Laboratory* dapat diterapkan pada hampir semua

mata kuliah berpraktikum untuk mendorong peningkatan keterampilan argumentasi ilmiah yang dapat berkontribusi pada literasi ilmiah dan berpikir kritis. Jika selama ini kegiatan praktikum didasarkan pada kegiatan eksperimen dengan mengikuti buku petunjuk yang langkah-langkahnya telah ditentukan dan tidak memungkinkan untuk terjadinya argumentasi peranannya relatif sedikit dalam tujuan pendidikan sains, maka dengan kegiatan ABILA ini dapat diharapkan hasil yang lebih baik. Kegiatan ABILA ini terbukti efektif dalam meningkatkan keterampilan argumentasi ilmiah dan keterampilan berpikir kritis yang menjadi bagian dari tujuan pendidikan sains.

Implikasi kedua dari penelitian ini adalah penggunaan instrumen tes essay atau *open ended questions* pada keterampilan argumentasi ilmiah dan berpikir kritis yang spesifik untuk suatu kegiatan praktikum dapat menjaring penilaian yang lebih objektif dan secara bertahap membantu mahasiswa mengembangkan keterampilan yang selama ini tidak dikembangkan dengan instrumen tes pilihan.

Selain itu, implikasi ketiga adalah penggunaan kriteria pengelompokan profil perkembangan keterampilan argumentasi ilmiah dari penelitian ini untuk mengelompokkan keterampilan argumentasi yang diukur pada penelitian lain. Pola profil perkembangan ini memungkinkan untuk menggambarkan sejauh mana perkembangan keterampilan seorang mahasiswa setelah mengikuti sebuah kegiatan praktikum dengan cara yang lebih terperinci dan menyeluruh.

Keempat, terdapat hubungan yang positif antara keterampilan argumentasi ilmiah dan keterampilan berpikir kritis. Semakin baik keterampilan argumentasi ilmiah mahasiswa maka ada kecenderungan semakin baik pula keterampilan berpikir kritisnya.

5.3. Rekomendasi

Penelitian ini juga memberikan beberapa rekomendasi yang dapat disampaikan. Pertama, penggunaan kegiatan ABILA dalam kegiatan-kegiatan praktikum sains sangat dianjurkan untuk mengembangkan KAI dan KBK mahasiswa di perguruan tinggi maupun siswa di sekolah. Pembelajaran sains di sekolah selama ini lebih memfokuskan siswanya untuk menghafal konsep dan

menjawab pertanyaan pilihan tidak memberikan kesempatan untuk berlatih argumentasi dan mengembangkan keterampilan berpikir kritis. Oleh sebab itu, perlu dilakukan penyebarluasan dan pengembangan program-program praktikum dan pembelajaran lain yang berbasis argumentasi untuk menghasilkan lulusan yang memiliki literasi ilmiah dan keterampilan berpikir kritis yang semakin baik.

Kedua, perkembangan keterampilan argumentasi ilmiah dan berpikir kritis mahasiswa yang dihasilkan dari penelitian ini berada pada kategori sedang. Hasil peningkatan yang hanya sedikit ini menunjukkan bahwa pengembangan kedua keterampilan bukanlah hal yang mudah. Butuh waktu bertahun-tahun untuk membekalkan kedua keterampilan ini pada mahasiswa. Oleh sebab itu, pembelajaran dan praktikum yang berbasis argumentasi dan berpikir kritis perlu untuk terus menerus diterapkan baik pada mata-kuliah-mata kuliah lain di perguruan tinggi maupun pada berbagai mata pelajaran di sekolah dasar dan menengah, mengingat pentingnya kedua keterampilan ini bagi masa depan siswa dan mahasiswa.

Ketiga, dalam penerapan kegiatan ABILA perlu memperhatikan beberapa hal agar berjalan dengan efektif dan memperoleh hasil yang maksimal. Perlu diperhatikan bagaimana mahasiswa berdiskusi dalam kegiatan argumentasi agar semua mahasiswa berpartisipasi. Di samping itu, perlu juga diperhatikan penerapan aturan dan tata tertib dalam mengikuti setiap tahapan kegiatan agar tidak ada sebagian mahasiswa mendominasi mahasiswa yang lain baik dalam kegiatan eksperimen maupun diskusi. Perlu diperhatikan pula pertanyaan penyelidikan yang menjadi panduan dalam melaksanakan eksperimen diusahakan merupakan pertanyaan yang memungkinkan terjadinya argumentasi agar diskusi dapat berkembang lebih dinamis.

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PERANAN ARGUMENT-BASED INQUIRY LABORATORY (ABILA) DALAM MEMBANGUN KETERAMPILAN ARGUMENTASI ILMIAH DAN BERPIKIR KRITIS MAHASISWA CALON GURU BIOLOGI
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